NETWORK WORLD
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Eicon pushes SNA out to the periphery

BY MICHAEL COONEY

Montreal

Eicon Technology Corp. this week will announce software that lets users deploy Data Link Switching (DLSw) across the enterprise without upgrading all their routers or installing new devices to carry SNA traffic over TCP/IP backbones.

The company will add a new feature — Desktop DLSw — to its personal computer-to-host access products for Windows, Windows NT, DOS and OS/2 that encapsulates 3270 or 5250 terminal-emulation traffic in TCP/IP packets. That will make it easier for customers to consolidate Systems Network Architecture and TCP/IP nets while delivering a more functional alternative to tn3270 for carrying SNA traffic over TCP/IP.

It will also eliminate the need for a DLSw-enabled router at each remote location.

Developed by IBM and blessed by the Internet Engineering Task Force, DLSw is a technology that lets SNA and Network

See **Eicon**, *page 84*

BIG IRON BOUNCEBACK

Mainframe sales rise, but has this rebound got legs?

BY JODI COHEN AND
MICHAEL COONEY

Despite being battered, beaten and down for the count, the venerable mainframe is pulling a Rocky, somehow managing to get up off the canvas for another round.

Mainframe sales at IBM, Amdahl Corp. and other companies are booming. Amdahl, for example, closed its books in 1993 with millions of dollars of taxable mainframe inventory on its books. But in the last 12 months, its mainframe inventory has shrunk 83%.

Although most of the companies selling Big Iron were discounting their products in 1993, sweet deals are harder to come by now and the companies cannot seem to make the machines fast enough.

Henry Cassel, director of compatible systems marketing at Amdahl, says he expects his firm's mainframe sales, measured in million instructions per second (MIPS), to increase by 17% both in 1994 and 1995. Analysts say IBM could see about a 10% increase in sales in the next year.

Why the resurgence?

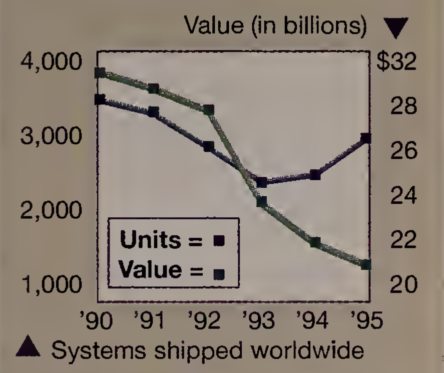
The theories are varied, including everything from pent-up demand loosened by the upturn in the economy, renewed belief among some that mainframes will never die and, perhaps most realistic, the fact that it is taking longer than expected for distributed, client/server-based systems to become an adequate replacement for hosts.

"Many users have been experimenting with the distributed client/server paradigm and found it to be lack-

See **Mainframe**, *page 83*

Double dip

Mainframe sales recover, but value slides as systems costs fall.



SOURCE: IDC, FRAMINGHAM, MASS.
GRAPHIC BY TERRI MITCHELL

LightStream joins Cisco switch club

BY MICHAEL CSENGER
AND JIM DUFFY

San Jose, Calif.

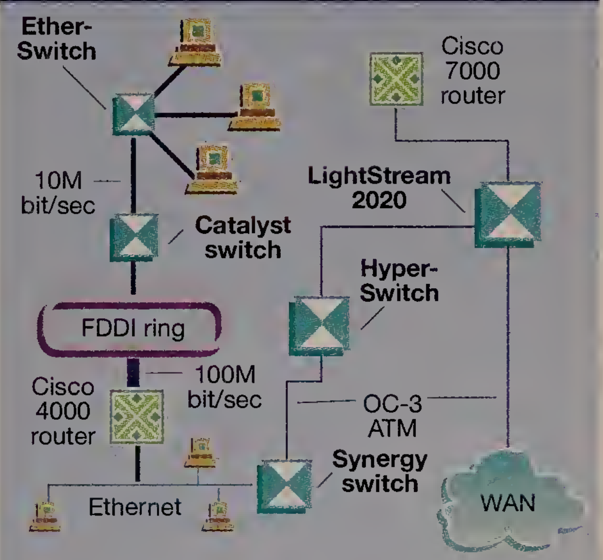
Cisco Systems, Inc. last week laid to rest rumors that it planned to buy a piece of wide-area ATM switch maker LightStream Corp. when it shelled out $120 million in cash to acquire the whole company from parents BBN and UB Networks, Inc.

LightStream's 2020 Asynchronous Transfer Mode switch will flesh out the high end of the CiscoFusion architecture, which is aimed at melding traditional routing with ATM-based virtual circuit switching.

Classified as an enterprise switch, the 2020 serves as a campus backbone node collapsing both router

See **LightStream**, *page 81*

Switches brew



LightStream's 2020 gives Cisco the high-end offering it needs to augment switches acquired from Kalpana (EtherSwitch) and Crescendo (Catalyst and Synergy), and codeveloped with NEC (HyperSwitch).

GRAPHIC BY TERRI MITCHELL

Harmonic heals holiday headaches

Innovative system helps retailers, customers get through crunch times.

Harmonic's Lewis helps keep retailers' lines moving.

BY TIM GREENE

Minneapolis

As you stand in long shopping lines this holiday season, take heart: there's a former network administrator out there whose retail network system may help cut your waiting time.

While working for Exxon Corp., Christophe Cooper found a way to streamline and speed up tasks, including credit card authorizations, gas pump monitoring and inventory tracking, for the company's 7,000 service stations and convenience stores.

Using dial-up lines, the system cuts the time it takes to conduct credit authorizations from as long as 30 seconds to less than 10.

Cooper's plan worked so well that Exxon decided to license the core technology to a start-up company, Harmonic Systems, Inc., and throw in some seed money. Cooper is now vice president of operations for Harmonic, which is marketing the system to midsize retail chains — those with 100 to 1,200 stores that

See **Harmonic**, *page 82*

NEWSPAPER $5.00

The Internet, IBM style: Advantis' Gary Weis discusses new 'Net access service. See page 12.

Aversion therapy: Banks overcoming fear of the 'Net

BY ADAM GAFFIN

Columbus, Ohio

Despite their security concerns, banks are being forced to do business over the Internet by emerging competitors such as Microsoft Corp. and credit card companies that envision a plethora of online financial services.

The threat of such competition largely explains why BankAmerica Corp. last week announced plans to team with Netscape Communications Corp. of Mountain View, Calif., to develop a secure Internet-based payment system.

Impending competition was also a driving force behind BankAmerica, Banc One Corp. and Citicorp becoming charter members of CommerceNet, a joint effort by the government and a consortium of large companies to develop techniques for secure Internet-based commerce.

The BankAmerica-Netscape system will link Netscape's client/server cryptography technology with the bank's credit card processing system.

Netscape uses algorithms developed

See **Banks**, *page 82*

Briefs

X/Opening up. Open standards proponent X/Open Company, Ltd. last week announced an extended agreement with the Network Management Forum (NMF) whereby it will work to develop their specifications in sync. This should help minimize duplication of effort and reduce member fees. X/Open also will publish selected NMF specifications in both hard copy and electronic form to make them more widely available.

Separately, the SQL Access Group, an industry consortium that has hammered out the evolving specifications for SQL, will become part of X/Open. The SQL Access Group will become one of X/Open's working groups. Members of both the SQL Access Group and X/Open said the move would allow SQL to evolve more quickly.

X/Open: (415) 323-7992.

Smog on file. Acting essentially as a systems integrator, MCI Communications Corp. is helping California build an advanced emissions-inspection program for motorists. Under a new testing procedure to be installed by mid-1995, inspection stations will conduct an electronic search to match the tested vehicle to its record maintained in a centralized statewide Vehicle Information Database System. The program should eliminate California's traditional paper Smog Certificate.

Broadband networking . . . sort of. Amoco Corp. last week suffered a glitch in a widely anticipated Capitol Hill demonstration of its ATM Research & Industrial Enterprise Study project. Company engineers had hoped to pull down a seismic image of the Earth's subsurface with a live video feed from an Amoco oil rig in the Gulf of Mexico, but were unable to establish the satellite link with the rig (the glitch was fixed for a later demonstration that day). Still, Amoco showed live collaborative manipulation of a prepared seismic image between engineers in Washington, D.C. and Houston.

Network General goes shopping. Network General Corp. last week bought a 10% stake in AIM Technology, a Unix systems management software provider. AIM will use the equity investment to accelerate development of its SharpShooter product, a fault and performance management application for Unix systems.

HP, Oracle team on objects. Hewlett-Packard Co. last week announced an agreement to deploy large-scale, object-oriented software applications on Oracle Corp. Oracle7 relational database using HP's Odapter software. Odapter is an object/relational adapter that lets developers create, manage and store objects in Oracle7 when using Smalltalk, C++ and other languages.

SCO changes. Tides are changing at Unix system and tools developer The Santa Cruz Operation, Inc. (SCO), which just shuffled its top management and expects to announce an acquisition this week; further details on the deal were unavailable. Lars Turndall, SCO president for nearly two years, was promoted to chief executive officer. And SCO's first elected chairman, Aluk Mohan, was promoted to president and chief operating officer.

Microsoft movement. Microsoft Corp. will get an equity interest in Mobile Telecommunication Technologies Corp. (MTEL) as part of an agreement in which Microsoft, Microsoft Chief Executive Officer Bill Gates and other minority interest owners of MTEL's Destineer Corp. will swap their stock for MTEL stock. Destineer, which holds the nation's first personal communications services license to operate a two-way nationwide wireless network, becomes a wholly owned MTEL subsidiary.

Seminar alert. *Network World* is sponsoring two upcoming seminar series, Analyzing Broadband Networks and Capitalizing on the Internet. The first is a two-day program directed by Mark Miller, author of seven books on internetworking technologies. It will be offered in 11 cities: Minneapolis, Jan. 18-19; Dallas, Jan. 31-Feb. 1; Chicago, Feb. 2-3; Los Angeles, Feb. 14-15; San Francisco, Feb. 16-17; Boston, Feb. 28-March 1; New York, March 2-3; Washington, D.C., March 14-15; Atlanta, March 16-17; Philadelphia, March 22-23; Detroit, April 4-5. To register, call (800) 643-4668 or (508) 820-7493.

Capitalizing on the Internet is a three-part satellite series: A Business Guide to the Internet, March 16; Internet Business Tools, April 20; Building Your Internet Business Case, May 4. To license the series, call (800) 643-4668.

For details on how to reach us, see page 86.

Table of Contents

NEWS

WirelessCo places high bid for a wide range of 30-MHz PCS licenses in a long-awaited auction. *Page 4.*

AT&T, Unisource may team for international carrier services. *Page 4.*

Digital releases its radically reworked DECnet/OSI to make it more appealing. *Page 6.*

Platinum unveils software that can move data between mainframe-based IBM DB2 databases and those in client/server environments. *Page 6.*

Cheyenne makes plans to attack the enterprise net market with ARCserve. *Page 8.*

LEGENT adds two software tools to help users measure the performance of their nets. *Page 10.*

IBM lets users take a quick peek at its Internet hand. *Page 12.*

Internet tip: IBM service on the Web. *Page 12.*

ENTERPRISE INTERNETWORKS

MIC is slowly but surely working to define a set of vendor-neutral management data repository standards. *Page 17.*

Q&A

Mayes discusses the burning issue of firewalls on the Internet. *Page 17.*

LAN WORLD

Searching for the dream tool for NetWare 4 managers. *Page L1.*

NetFRAME offers DataJet update with better performing and more reliable server backups. *Page L1.*

WUGNET: WinSock 2.0 — a specification for the next generation of net-aware apps. *Page L2.*

GLOBAL SERVICES

Sprint's alliance with FT and Germany's DT may be victim to major restrictions. *Page 31.*

All RBHCs but BellSouth are trying to stake a claim in the next big federal government contract. *Page 31.*

CLIENT/SERVER APPLICATIONS

DB/EXPO crowd searches for Windows-based power tools, object-oriented software. *Page 43.*

NCD will secure banking on the 'Net with its client software and help from First Virtual. *Page 43.*

Internet tip: CA's Ingres databases. *Page 46.*

Buyer's Guide

Spooked by the idea of having to evaluate LAN imaging tools? Fear not. The trend to modularity vastly eases the task. ***Page 55.***

In a Nutshell

You may be fluent in English, but to assure document exchange across nets, you'll need to brush up on SGML. ***Page 67.***

OPINIONS

Scott Bradner on paying for the 'Net. *Page 23.*

Mark Gibbs on permissible net use. *Page L14.*

Eric Paulak on the MCI rate hike. *Page 36.*

Mike Rothman writes a letter to Santa. *Page 47.*

Editorial on chargeback's high price. *Page 50.*

James Kobielus on firewalls' security. *Page 50.*

Ben Rothke separates hype from reality. *Page 51.*

In-box. *Page 51.*

Back to Reality: Insecurity on the 'Net. *Page 86.*

CyberSpeak. *Page 86.*

Network HELP *desk*

Network World *tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Alison Conliffe at (800) 622-1108, via fax at (508) 820-1103 or (508) 820-3467, via the Internet at aconliff@world.std.com or via CompuServe at 75471,2725.*

I am looking for management software that supports the Remote Monitoring (RMON) protocol. I have heard that NetMetrix is such a product. Can you help me get more information about this product, as well as identify other RMON products I may consider?

Werner Kohler, Wallisellen, Switzerland

Bret Curtiss and Ron Cooney, technical analysts with Paranet, Inc., a network services provider based in Houston, reply:

You're asking about a network analysis package from Hewlett-Packard Co.'s Network Test Division in Colorado Springs. Although NetMetrix's RMON support is still in the early stages of development, it's probably as good as anything else available today. It is, however, designed for use with HP's agents. In this mode, there are excellent displays and user interfaces available for a wide range of network analysis needs. When you're using the NetMetrix package with RMON agents, however, be prepared to go through the manual page by page to find out about the limitations on many of these great features. For example, the Load Monitor's interface is not as useful and intuitive with RMON agents, and the Internetwork Monitor does not support RMON agents at all.

Recently, HP added much more support for RMON agents, including LanProbe and ProbeView (which brings RMON capabilities to the PC), along with utilities for accessing both Ethernet and token-ring RMON Management Information Bases.

RMON is a standards-based approach to remote network management, however, the industry has been slow to embrace it. The standards are grouped for Ethernet into: History, Alarm, Host, Host Top N, Matrix, Filter, Packet Capture and Event. For token ring, the groups are: MAC Stats, Promiscuous Stats, MAC History, Promiscuous History, Ring Station, Ring Station Order, Ring Configuration and Source routing. Many offerings are RMON compliant to varying degrees depending on how many of these

See **Help desk**, *page 52*

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WirelessCo sprints to lead in broadband PCS auction

BY DAVID ROHDE

Washington, D.C.

Just as it said it would, a consortium headed by Sprint Corp. last week broke strong out of the gate in the long-awaited auctions for broadband personal communications services (PCS) licenses.

Dubbed WirelessCo, L.P., the Sprint consortium – which includes cable TV powers Comcast Corp., Cox Cable Communications, Inc. and Tele-Communications, Inc. – placed the high bid for a wide range of 30-MHz PCS licenses, including rights to regions surrounding Boston, Chicago, Dallas, Detroit and San Francisco.

The bids fill in the mobile portion of Sprint's broad-based strategy to provide flexible, single-source voice and data services to business customers.

Pending approvals, the same Sprint-cable consortium is expected to attain ownership of competitive access provider Teleport Communications Group and devise ways for the cable firms to carry broadband data communications (*NW,* Oct. 31, page 1).

According to the Federal Communications Commission, if the auction ended where it stood last Thursday, WirelessCo would control PCS licenses in markets with a total population of 69.5 million.

But winning the licenses would not guarantee Sprint success in its strategy, observers cautioned. The cost of the licenses do not include the cost of building PCS nets. And PCS services have yet to be market-proven, despite their ultimate promise of supporting multimegabyte file transfers and remote LAN access, as well as mobile voice.

Standing in second place overall, also as expected, was a consortium known as PCS Primeco. This group – formed by Bell Atlantic Corp., NYNEX Corp., US WEST, Inc. and the former Pacific Telesis Group subsidiary now known as AirTouch Communications, Inc. – stood as high bidder for the second available licenses in Chicago and Dallas.

The group had made it known that it would concentrate on areas where it did not have a presence – the territories of the other regional Bell holding companies. Its total high bids covered a population of 36 million, the FCC said.

Yet the two fattest prizes lay elsewhere. High bid for the huge Southern California territory was taken early on by Pacific Telesis, which – having divested its cellular operations – said it would duke it out with anyone for California territories.

And in a seesaw battle, Craig McCaw's ALAACR Communications overtook an affiliate of GTE Corp. on Thursday to place the highest bid of all – $129 million – for the New York region (see graphic). GTE had bid $100 million the day before.

In something of a surprise, 21 of the 99 available licenses received no bids at all through last Thursday. Though most were for small territories, they included a few big cities. FCC officials said they were not concerned because the broadband auction is designed to proceed at a snail's pace of one round of bidding a day. ◼

Broadband PCS: high bidders in 10 largest markets

PCS AUCTION update

Shown is the high bidder in each of the two available 30MHz blocks in each market. Three markets – New York, Southern California and Washington, D.C.-Baltimore – have only one block available, due to an earlier pioneer's award.

Round 4, Thursday, Dec. 8

Region	Bidder(s)	Bid (in millions)
New York	Craig McCaw	$129.4
Southern California	Pacific Telesis	$57.4
Chicago	WirelessCo PCS Primeco	$17.2 $13.0
San Francisco Bay area	WirelessCo	$58.1
	American Portable Telecommunications	$65.3
Detroit	AT&T WirelessCo	$6.0 $4.0
North Carolina	AT&T BellSouth	$5.9 $9.8
Dallas-Fort Worth, Texas	WirelessCo PCS Primeco	$3.9 $10.5
Boston-Providence	WirelessCo AT&T	$17.0 $12.0
Philadelphia	PhillieCo Southwestern Bell	$11.0 $15.4
Washington D.C.-Baltimore	GTE	$30.7

AT&T and Unisource may join forces for int'l carrier services

BY TIM GREENE

Basking Ridge, N.J.

Reports last week of an impending pact between AT&T and Unisource NV were treated as more than just rumor by industry observers who said the move would be another step toward long-distance European service comparable to that now available in the U.S.

The deal, reported in *The Wall Street Journal* and confirmed by other sources last week, would mean an AT&T-Unisource joint venture to provide international voice and data services.

"This is a major, major event," said Daniel Briere, president of the TeleChoice, Inc. consulting firm in Verona, N.J.

Unisource is a joint venture between PTT Telecom Netherlands, Sweden's Telia and Swiss Telecom PTT, and is in the process of signing on Telefonica de Espana SA.

Unisource is currently part of the AT&T-led WorldPartners program and plans to implement WorldSource Virtual Network Service, WorldSource Frame Relay Service and WorldSource Private Line Service by the end of the month.

But a new company created by Unisource and AT&T would go further than the current WorldPartners alliance, with the new organization likely to apply for operating licenses in the largest European countries, according to market analysts.

Unisource officials in the Netherlands and an AT&T spokesman in New Jersey would neither confirm nor deny that a joint venture would be announced this week.

But sources at both companies said negotiations have been under way for months to explore ways to strengthen the alliance AT&T already has with Unisource in the WorldPartners program.

Once services are established, "the European Union will become like the U.S. for the purposes of telecommunications."

And company officials have given similar indications over the last few months.

"We cannot implement the core strategy of our company without partners," said Pier Carlo Falotti, European president of AT&T, earlier this fall. The company's goals include bolstering its multimedia network and network-centric information applications, he said.

TeleChoice's Briere said the new pact would solidify the relationship between AT&T and Unisource, a move that would give customers confidence in being able to purchase reliable service.

The deal would promote "seamless everything," he said.

The AT&T-Unisource alliance would be the third major collaborative effort in Europe involving one of the Big Three U.S. interexchange carriers, following the BT-MCI joint venture and the pending deal involving Sprint Corp., France Telecom and Deutsche Bundespost Telekom.

AT&T could bring its European T-1/T-3 data network while gaining access to Unisource's voice nets, the key missing element for AT&T in Europe, said Berge Ayvazian, vice president of The Yankee Group consultancy in Boston.

Once services are established over the next several years, "the European Union will become like the U.S. for the purposes of telecommunications," Ayvazian said. "[But] it isn't going to happen overnight."

One obstacle to an AT&T-Unisource joint venture has been opposition from the PTTs that make up Unisource to any deal that would give AT&T majority control, industry insiders said.

"With [the planned] 60/40 split, Unisource members can be happy that they have majority stake, but AT&T still gets the leverage it seeks in Europe," said Brian Van Dussen, telecommunications analyst with The Yankee Group in the U.K.

The deal would also give BT more fuel for its protests that U.S. companies are gaining unfair leverage in closed European markets by buying into state monopolies.

Earlier this week, BT asked the Federal Communications Commission to examine the current AT&T-Unisource alliance, as well as the pending deal for the French and German PTTs to buy a 20%, $4.2 billion stake in Sprint (see story, page 31). ◼

PRODUCT WRAP-UP

Alantec, Chipcom and others turn on the LAN switches

BY MARGARET DORNBUSCH

The LAN switching market continued to heat up last week, with Alantec Corp., Chipcom Corp. and Fibermux Corp. leading a pack of vendors making new product announcements.

Madge Networks, Inc. and SysKonnect, Inc. also announced new products in the switching market – one that research firm International Data Corp. (IDC) said will more than triple in size from $90 million last year to $327 million this year. Chip Pettirossi, a senior analyst at IDC, said the market could almost double to $600 million next year and hit $1 billion in 1996 as both hub and router vendors target the technology.

Melinda Le Baron, research director at Gartner Group, Inc., a Stamford, Conn., consultancy, said LAN switching has proven popular because it provides users with an easy way to gain more bandwidth and prepare for Asynchronous Transfer Mode technology.

CROSSING THE ALANTEC

Alantec last week rolled out a new 16-port Fiber Distributed Data Interface switching module for its chassis-based PowerHub 7000 switching hub.

The PowerHub 7000 FDDIswitch module enables users to configure each of 16 FDDI rings independently for bridging or routing IP, IPX, Digital Equipment Corp. DECnet and Apple Computer, Inc. AppleTalk protocols. The switch module can forward traffic at up to 800,000 packet/sec.

Each switch module takes up five slots in the PowerHub 7000, which has an expandable Xplane backplane. The hub also supports Ethernet, fast Ethernet and ATM.

CHIPPING IN

Chipcom also increased its LAN switch offerings last week with an 18-port token-ring switch module for its ONcore Switching System and a scaled down, 10-slot version of the ONcore Switching System for Ethernet workgroups.

The ONcore Token Ring Active Module-Switching Media Module supports switching among as many as 18 token-ring nodes and 10 backplane rings. The module also features two ports that can be configured as fully repeated ring-in/ring-out trunks that allow connections to other ONcore Switching Systems, token-ring modules from Chipcom's ONline System family or other stand-alone devices.

The 10-Slot B ONcore Switching System supports ONline and ONcore Ethernet modules, and features as many as six Ethernets on its backplane.

See Switches, *page 84*

CORRECTIONS

A recent article (Nov. 21, page 22) misidentified a product LEGENT Corp. is developing to link its Paradigm trouble-ticket application with IBM's Information/Manager (Info/Man) product. LEGENT will be selling the Paradigm/XP Info/Man Gateway. The product is not available, and the company declined to give pricing information.

Clarification: Due to misinformation provided by event officials, a recent story incorrectly stated the number of problem scenarios Digital Equipment Corp. won at the Enterprise Management Summit (Nov. 28, page 6). Digital won four.

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Circle Reader Service **#43**

Digital releases DECnet/OSI with TCP/IP, local naming extensions

BY JIM DUFFY

Maynard, Mass.

Digital Equipment Corp. last week made good on its promises to radically rework DECnet/OSI so it's more appealing to DECnet Phase IV users and to those migrating to TCP/IP.

Digital announced Version 6.0 of DECnet/OSI for OpenVMS, an upgrade that allows users to run DECnet and Open Systems Interconnection applications over TCP/IP nets instead of restricting them to DECnet or OSI protocols (*NW*, July 11, page 13). It also includes a local naming database that supports as many as 100,000 nodes, a feature that obviates the requirement to implement Digital's distributed name service (DECdns) for networks over 150 nodes (*NW*, May 16, page 1).

The TCP/IP support in DECnet/OSI 6.0 — which Digital referred to internally as DECnet/IP — is an extension of the IETF RFC 1006, which allows access to OSI applications over TCP/IP. Digital's extension allows access to DECnet applications over TCP/IP.

Digital has submitted its extension to the Internet Engineering Task Force for consideration as a request for comment. If adopted, that would make it possible for any vendor to implement the same enhancement within its own TCP/IP product. Indeed, DECnet/IP supports Digital's TCP/IP Services for OpenVMS stack and other third-party TCP/IP stacks for OpenVMS.

Digital has submitted its extension to the Internet Engineering Task Force for consideration as a request for proposal.

A competitive offering from TGV, Inc., called Phase/IP, only supports TGV's MultiNet stack (*NW*, Aug. 22, page 1). And although DECnet/IP can work with MultiNet — the leading TCP/IP product for OpenVMS systems — users say it is incompatible with Phase/IP, which forces customers to make a tough decision.

"[Digital's product] certainly gives us the ability to run DECnet over IP. But since it is fundamentally incompatible with TGV's implementation, we're going to have to choose to go with one or the other," said R. Kevin Oberman, engineering network manager at Lawrence Livermore National Laboratories in Livermore, Calif. "The cost to

See **Digital**, *page 8*

Platinum shows mettle with DB2 replication tool

BY BARB COLE

Oakbrook Terrace, Ill.

Platinum Technology, Inc., an IBM DB2 management tools specialist, this week will roll out new software for moving or replicating data between mainframe-based IBM DB2 databases and those running in client/server environments.

When it ships later this month, Platinum Data Transport may be used to move data from DB2 mainframe databases to IBM's DB2/2 and DB2/6000, Sybase, Inc.'s SQL Server System 10, Microsoft Corp.'s SQL Server or Oracle Corp.'s Oracle7 databases.

By the second quarter of next year, however, Platinum plans a release of Data Transport that will replicate changes on those client/server databases to DB2. And by the end of 1995, users will be able to replicate data among any of the supported databases using Data Transport, according to Susan Kahles, product marketing manager of open systems at Platinum.

"These guys [at Platinum] understand DB2," said Barry Wilderman, a program director at consultancy META Group, Inc. in Stamford, Conn. "[Data Transport] can get to DB2 data quickly and get it typed down to several databases, which is key to data warehousing."

Replication entails keeping distributed databases synchronized by copying transactions to databases across an enterprise. Users are increasingly looking to replicate data across databases from a single vendor as well as across databases in heterogeneous environments.

Sybase and IBM are among the vendors that have pledged to deliver heterogeneous replication by year end.

Platinum's replication software may prove to be the best, though, at getting data out of DB2 the fastest, analysts said.

The Platinum software has components that run on the mainframe, server and client. The server software supports Unix, including IBM's AIX and Hewlett-Packard Co.'s HP-UX, as well as OS/2 and Novell, Inc.'s NetWare. The client software runs on Windows and OS/2 machines.

Using a point-and-click interface, users specify the target database type, and Data Transport automatically sends copies of the DB2 data to servers running that database. Data Transport loads the data, builds the database tables and creates indexes.

The software costs $3,900 per server.

NEW GATEWAYS

Separately, Sybase-owned MDI last week rolled out new gateways for accessing Informix Software, Inc.'s Informix On-Line and Oracle's Rdb databases via Sybase OmniSQL Server. The gateways will ship later this month.

The company also said it will make its line of OmniSQL gateways available on Windows NT and Digital Equipment Corp. Alpha-based OpenVMS machines.

Pricing was not available.

©Platinum: (708) 620-5000; MDI: (303) 443-2706.

CA readies new version of Ingres DBMS

BY BARB COLE

New York

Computer Associates International, Inc. will roll out a new version of its CA-OpenIngres database next month that users said will include all the features promised by The ASK Group, Inc. — before the company was acquired by CA — plus several unexpected enhancements.

CA confirmed last week that users can expect speedier Open Database Connectivity (ODBC) access to CA-OpenIngres databases because of improved ODBC drivers the company is bundling in the release, called Version 1.1.

"We've improved performance by as much as 500% for some Windows applications accessing CA-OpenIngres via ODBC," said Sanjay Kumar, president and chief operating officer at CA.

In addition, users will be able to do partial database backup and recovery instead of having to work with entire databases.

CA acquired Ingres, plus a development tool called Ingres OpenRoad and manufacturing software from The ASK Group last April.

At the time, users questioned whether CA, a company best known for mainframe software, could successfully evolve the Ingres products, which target client/server environments.

CONFIDENCE BUILDER

Longtime Ingres database users attending DB/EXPO 94 said they are more confident in CA since they learned of the plans for Version 1.1.

"I'm a CA-Ingres user, and I didn't want to admit that a few months ago because I didn't want to be pitied. I don't feel that way anymore," said Allan Reid, a database administrator with Denver-based Concord Corp., which has several CA-Ingres databases.

"We were pretty worried, but we've seen a lot of improvements in the product since CA took over," said Joe Greulich, a database administrator at Roberts Express, a shipping company in the Midwest.

As expected, CA last week also said its OpenRoad for Windows 3.1 and Windows NT development tools will be out by year end.

The Unix version will ship in March, three months earlier than expected.

CA, which already lowered the price of CA-OpenIngres by about 50%, last week announced that it will offer CA-Ingres resellers a share of license fees typically owed just to CA and will waive any fees associated with porting CA-OpenIngres that are typically charged to hardware vendors.

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SunSoft object proposal gets nod from OMG

BY ADAM GAFFIN

Framingham, Mass.

The Object Management Group last week approved standards for getting object request brokers (ORB) from different vendors to communicate with one another.

The consortium's board of directors overwhelmingly supported a proposal from SunSoft, Inc. that was backed by vendors including IBM and Novell, Inc. for a new TCP/IP-based protocol that ensures interoperability among ORBs.

Version 2.0 of the group's Common Object Request Broker Architecture (CORBA) will incorporate a scheme called Unified Network Objects (UNO) that includes naming specifications and other standards aimed at creating a lingua franca among ORBs.

ORBs coordinate interaction between objects in a distributed network, storing information about the location of objects so that applications and objects on one platform can interact with those on other machines (*NW*, June 6, page 40).

Objective history

May 1990	OMG is founded.
Nov. 1991	CORBA 1.0, which describes how to build an ORB, is released.
Dec. 1994	CORBA 2.0, which provides standards for getting ORBs from different vendors to talk to each other, is released.
1st half of 1995	Expected delivery of OLE/OpenDoc integration standards and delivery of security standards for object communication.

GRAPHIC BY SUSAN SLATER

Although CORBA 1.X laid out general guidelines for the operation of ORBs, it did not specify how they would talk to one another, so each vendor developed its own, incompatible mechanism for inter-ORB communications.

OMG President Chris Stone predicted that vendors will have CORBA 2.0 products available within a few months.

Richard Probst, manager of business development for SunSoft Object Products, confirmed that his company would try to adopt CORBA 2.0 for its Distributed Objects Everywhere suite in mid-1995.

Other backers included Iona Technologies, Ltd. of Dublin, Ireland, Expersoft Corp. of San Diego, Bell Northern Research of Canada and ICL of London.

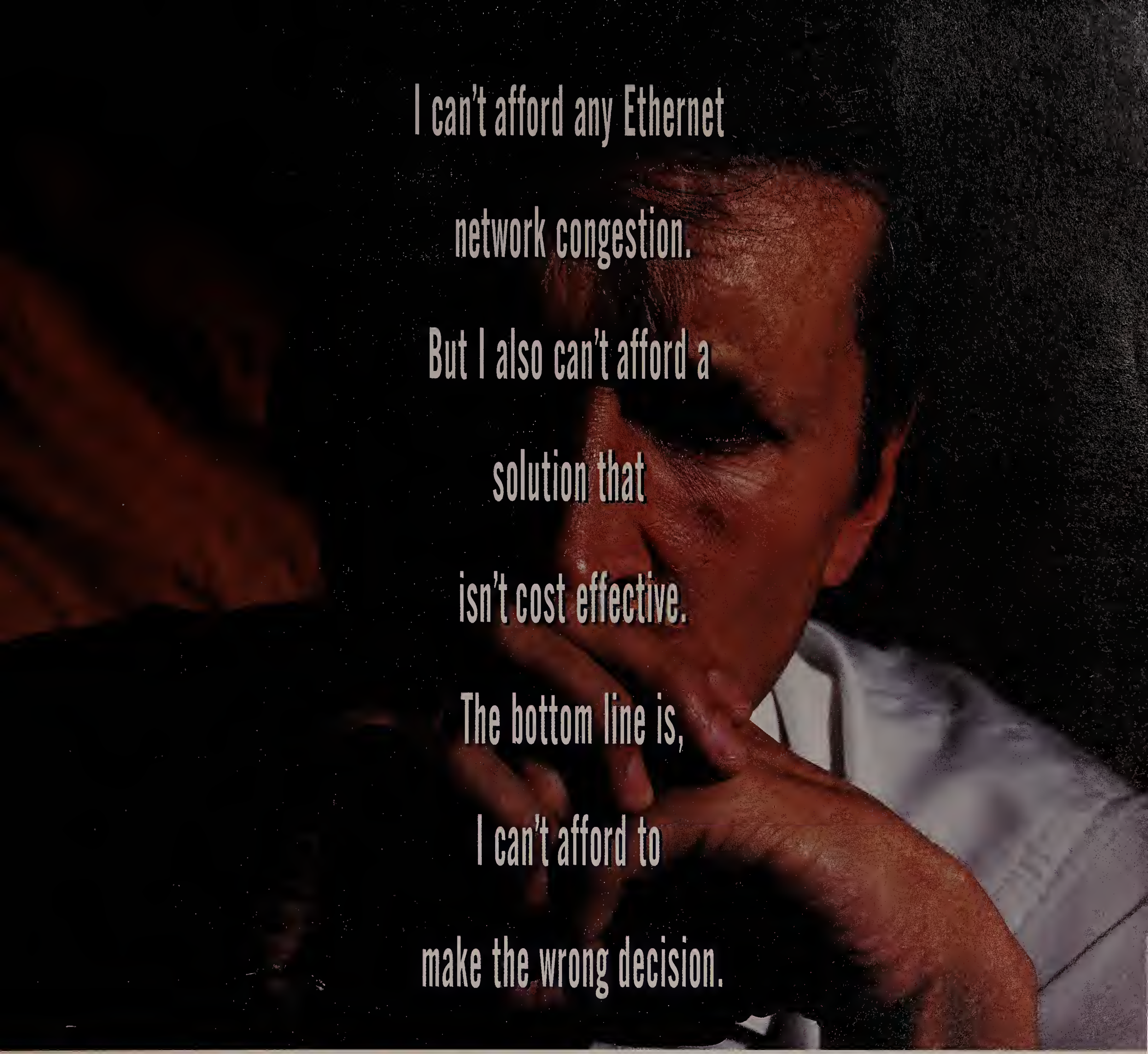
The vote is a defeat for Hewlett-Packard Co., Digital Equipment Corp. and the Open Software Foundation, Inc. (OSF), which had pushed a plan based on the OSF's remote procedure call (RPC).

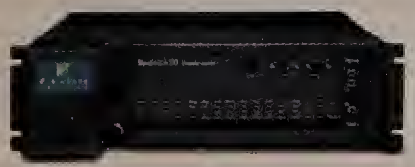
HP, Digital and the OSF argued that the UNO proposal represented an entirely new protocol that would not work across non-TCP/IP nets. However, Novell has demonstrated an UNO port for NetWare networks, while ICL has developed similar software for Open Systems Interconnection-based networks.

CORBA 2.0 will allow the use of the OSF RPC as an "environmental extension" but only if the UNO specifications are also followed.

Mike Matthews, product market manager for distributed computing at HP, said that until customers tell HP something different, the company will continue to use OSF RPCs for communication between objects, a sentiment echoed by Robert Bismuth, corporate director of standards at Digital.

Bismuth said he thought the decision was rushed. The board made the decision, he said, because it believed "any choice was better than no choice" and to avoid "taking a hit in the press."





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Circle Reader Service **#34**

Forum tries to revive 25M bit/sec ATM

BY MICHAEL CSENGER

The ATM Forum last week voted to reconsider a proposal for 25M bit/sec Asynchronous Transfer Mode over low-cost desktop ATM solutions.

IBM introduced a plan for 25.6M bit/sec ATM in March 1993, but it was shot down in favor of a 51.8M bit/sec Synchronous Optical Network (SONET)-based specification in August. In the wake of that decision by the ATM Forum, 30 network vendors launched the Desktop 25ATM Alliance to keep their specification alive in an ad hoc way, promising to deliver desktop ATM products more economically than the SONET approach would allow.

> **"If native ATM and drivers don't come along, then I'm not sure 25M bit/sec ATM has a big future."**

The Desktop 25ATM Alliance claims SONET framing adds unnecessary costs to low-speed ATM LAN solutions. Competing vendors say SONET-based components will fall in price so quickly that a 25M bit/sec alternative is not worth pursuing and that users making the jump to ATM might as well go all the way with 51M or 155M bit/sec SONET OC-3 to the desktop.

Members of the Desktop 25ATM Alliance — most of whom are active in the ATM Forum, as well — won a motion to reconsider their proposal at a Forum meeting in Kyoto, Japan, on Dec. 2.

But the debate has gotten more complex. Chip maker PMC-Sierra, Inc. last month introduced a 25.9M bit/sec ATM alternative that incorporates SONET framing, while the original 25.6M bit/sec proposal is based on token-ring technology.

"[PMC's] argument is that you get better network management and uniformity with a SONET-based approach," said Selina Lo, vice president of marketing at Centillion Networks, Inc., a token-ring/ATM switch vendor. "It's not clear yet that their approach is cost-justified, but PMC has some big muscle behind it."

PMC's backers include Cisco Systems, Inc., Cabletron, Inc. and Fore Systems, Inc. Several start-ups, including WhiteTree Corp. and Madge Networks, Inc., along with IBM, lead the 25.6M bit/sec camp. AT&T is the original 51.8M bit/sec SONET proponent.

Among users, there does not seem to be any clamor for low-speed ATM of any sort. "It seems like an answer to a question that nobody's asked," said Bert Manfredi, a senior engineer building communications networks for the U.S. Navy at Rockwell's Communications Systems Division. "I haven't seen any driving need for slow ATM as opposed to fast or switched Ethernet."

Even the more open-minded observers agree that the jury is still out on low-speed ATM. "I don't think users can decide the issue until they have real choices to compare," said Ron Jeffries, president of Jeffries Research, Inc., a consultancy in Santa Maria, Calif. "The vendors are convinced their products will be substantially cheaper, and they understand that the main competition is switched Ethernet."

The advantages of low-speed ATM to the desktop probably will not be clear until ATM-based applications hit the market. "If native ATM and drivers don't come along, then I'm not sure 25M bit/sec ATM has a big future," Jeffries said. ☒

Digital

Continued from page 6

us is approximately equal for the two, so it's going to be a case of looking at the technical merits and picking one."

The expanded local naming feature, meanwhile, will appeal to DECnet users that have to migrate to DECnet/OSI but are squeamish about implementing DECdns. Local naming, used in DECnet Phase IV, enables each node in the network to maintain its own database that maps names into addresses. A central administration point is maintained to distribute name and address mappings to end nodes.

With DECdns, name servers are distributed in the net. DECnet/OSI end nodes automatically register with name servers when they are added to the net and then scan the server's address tables to establish initial communication with a target end node.

But DECdns is unpopular with some users, who say it is cumbersome to configure and implement. And with the percentage of DECnet traffic decreasing, users do not want to change the naming conventions they are accustomed to in order to keep up-to-date with the OpenVMS operating system (*NW,* Dec. 20, 1993, page 1).

Other features of DECnet/OSI 6.0 include: support for the Domain Name Service/Berkeley Internet Name Domain directory for TCP/IP networks; a Motif-based graphical user interface for Digital's Network Command Language, which is a syntax for management of DECnet/OSI nodes; and support for 4,500-byte Fiber Distributed Data Interface packets.

DECnet/OSI 6.0 also includes reachable address support, which determines the best path to reach a target node; reverse path caching, for tracking and remembering paths through the network; and segregated mode routing, which allows end systems to choose DECnet/OSI or non-DECnet/OSI routers for transport.

DECnet/OSI 6.0 is priced from $1,020 to $6,660 and is available now.

©Digital: (800) 344-4825.

Cheyenne plotting course for Mercury's, ARCserve's future

BY KEVIN FOGARTY

Roslyn Heights, N.Y.

Cheyenne Software, Inc. last week outlined plans to attack the enterprise network market with ARCserve by improving the LAN backup software's heterogeneous network support and providing integration with popular net management platforms.

Under the strategy, code-named Mercury, Cheyenne will add a software layer to ARCserve, enabling the LAN backup product's three basic components — engines, managers and agents — to work together, regardless of the network or desktop operating system on which they run. Cheyenne will also add Simple Network Management Protocol support so that ARCserve can work with management systems such as Hewlett-Packard Co.'s OpenView and IBM's NetView.

Mercury builds on Cheyenne's efforts to move ARCserve beyond a Novell, Inc. NetWare-centric solution to a product that runs easily across many popular platforms. It is currently available on OS/2, DOS, Apple Computer, Inc. Macintosh and various Unix versions.

> Cheyenne aspires to become the premier player in the enterprise storage marketplace. We won't provide all the pieces, but we will provide the platform to integrate [them]."

James McNiel

Cheyenne sees Mercury as a way to make ARCserve more flexible for users and as a way to position storage management as a core network service, said James McNiel, executive vice president of Cheyenne.

The Mercury technology will be included in all versions of ARCserve by the end of next year, McNiel said. It will appear first in the ARCserve for NetWare engine early next year, he added.

MERCURY RISING

ARCserve consists of desktop computer-based agents that collect the data to be backed up, workstation-based managers that determine when and where data will be stored, and server-based engines that receive data from the agents and take orders from the managers.

Currently, users must buy engines and managers that support the same network operating system and then hope they support agents for the user's installed desktop operating systems. Most engines only support managers and agents running on one or two operating systems.

Under the Mercury plan, Cheyenne will also boost ARCserve's performance. Future versions of ARCserve will have the ability to run an unlimited number of concurrent jobs, break up large blocks of data and stripe it across several media types before tracking the location of data fragments to check data integrity.

ARCserve will also be upgraded to support terabyte changers and silos — storage media found in host systems but not in client/server nets.

MANAGING NICELY

ARCserve's new SNMP support under Mercury will give users the ability to receive alerts from ARCserve on their existing network management consoles rather than running a separate console from Cheyenne.

That's fine, but "SNMP alert capability is not enough," said Paul Mason, an analyst for International Data Corp. in Framingham, Mass.

"You need the ability to launch applications and do things like correlate events, so when a database backup fails, you know not only that, but you can correlate that to a memory allocation failure picked up by OpenView," he said.

And Cheyenne is working on it. "Our ultimate goal is, if the customer wants their console to be HP OpenView, we want them to be able to do anything they need using OpenView," McNiel said.

The Mercury technology is a positive step for Cheyenne and for storage management technology in general, Mason said. Network backup in the client/server world is still in a primitive state compared to that in the mainframe world, he added.

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Cheyenne addresses user concerns

Cheyenne Software, Inc. has added features intended to make its products more stable and bulked up its technical support staff with more bodies.

The moves are intended to correct problems, including buggy software and bad support, which were first brought to light in *Network World* Reader Advocacy Force stories (March 7, page 1; Nov. 22, 1993, page 4).

Cheyenne's increase in support staff, from 40 to 104, has drastically cut the length of time users spend on hold, said Lori Boyland, director of technical services.

The company also now takes on responsibility for identifying a problem, rather than pointing the finger at products from other vendors, a practice users found particularly annoying.

And Cheyenne will offer a for-fee, 24-hour, seven-day-a-week phone support service sometime next year, Boyland said.

"Their phone coverage has definitely improved a great deal," said Richard Randazzo, LAN administrator for Bank of New York in Manhattan. Cheyenne cut hold time, which had averaged nearly 30 minutes, to "just a few minutes, and the knowledge [of the support technicians] has also improved somewhat," he said.

Cheyenne has shored up the stability of ARCserve by adding a "preflight check" that runs an end-to-end test of the backup system, said James McNiel, executive vice president of the firm. The utility checks to make sure all the necessary components are present on the net and are compatible.

That should help users track down and fix problems more quickly, said Ben Rothke, network manager for Brooklyn, N.Y.-based financial market research firm Track Data Corp. Rothke was one of the most vocal Cheyenne critics earlier this year.

"The problem they have is that there are so many components they have to be compatible with, it's impossible to test them all," he said. The utility will not solve that problem, he said, but it will make identifying conflicts easier.

BY KEVIN FOGARTY

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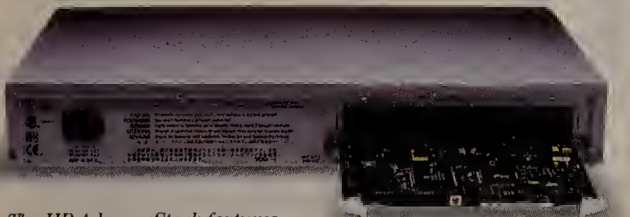

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LEGENT adds client/server net monitoring and modeling tools

BY MICHAEL COONEY

Herndon, Va.

LEGENT Corp. last week announced two software tools that will help users measure the performance of their client/server networks, pinpoint trouble spots and build models to help with capacity planning.

Paramount/XP-Response Manager and Paramount/XP-Capacity Application Modeler for Distributed Systems are part of LEGENT's Cross Platform Environment family, the firm's suite of integrated distributed systems and network management products.

"The cost of deploying client/server systems is much higher than most people thought it would be two years ago, so we are providing the tools to help users get a better handle on what they have now and help them [plan for] the future," said Phil Carrai, vice president and general manager of LEGENT's Enterprise Systems Management Division.

Response Manager gathers and analyzes utilization figures from token-ring and Ethernet LANs, and monitors response times between clients and servers. It works with all the major LAN operating systems, including Novell, Inc.'s NetWare, Banyan Systems, Inc.'s VINES, IBM's OS/2 LAN Server and Microsoft Corp.'s LAN Manager. It also can monitor response times in mainframe-based Systems Network Architecture nets, and between TCP/IP telnet terminals and servers.

Response Manager is made up of three components. The agent component resides on each LAN segment and includes a dedicated Intel Corp. 80386-based personal computer running LEGENT's LANSpy 2.0 probe. It collects LAN traffic statistics and other performance data, and passes it to the server component running on a Windows NT server. The server collects the data and stores it in an SQL database, which comes with the product.

Using rules-based technology, Response Manager calculates baseline device performance levels, establishes service-level thresholds, generates exception reports and monitors historical trends. Users can customize thresholds and service levels, as well.

Management mix

Product	Pricing	Availability
Paramount/XP-Response Manager	Starts at $15,000	Now
LANSpy	$6,000-$18,000	Now
Paramount/XP-Capacity Application Modeler for Distributed Systems	Starts at $33,000	1Q 1995

GRAPHIC BY TERRI MITCHELL

Data generated from this analysis is presented graphically on the third component, a Windows 3.1 client PC linked to the server. Eventually, this client function will be integrated onto the server platform, Carrai said.

"Performance Manager can recommend changes on-screen. For example, if it notices a particular LAN segment being overutilized, it will tell the user to add more bandwidth or upgrade some hardware," Carrai said.

"The inability to monitor client/server environments end to end has been a problem for users," said Paul Mason, research manager for the enterprise systems management program at International Data Corp., a research firm in Framingham, Mass. "Being able to monitor performance is critical as users scale up their client/server environments."

LEGENT's other new product, Capacity Application Modeler, is based on technology LEGENT acquired from Advanced Systems Technologies, Inc. It lets users build a model client/server environment and simulate traffic flow under multiple net configurations.

"Users can also deploy it to see how adding a new application or devices will impact their existing environment," said Carrai.

Capacity Application Modeler currently runs on a Hewlett-Packard Co. HP-UX workstation, but Carrai said it will also be available on the Windows NT platform next year.

HP's Professional Services Organization announced it would be using Capacity Application Modeler as its primary tool to help users build client/server systems.

"We evaluated competing modeling tools from Comdisco [Inc.] and BGS [Systems, Inc.] but found the LEGENT product to be the easiest to configure, plus it lets us design a wider variety of [networks]," said Andy Narron, a senior technical consultant at HP.

Jim DeVries, an analyst with the Southern California Edison Co. in Rosameade and a beta user of the new LEGENT products, has given LEGENT an important role.

"We use the LEGENT tools to see what happens to the performance of our network when we fully load it with a new application," DeVries said. "That performance determines whether or not we buy the [application]."

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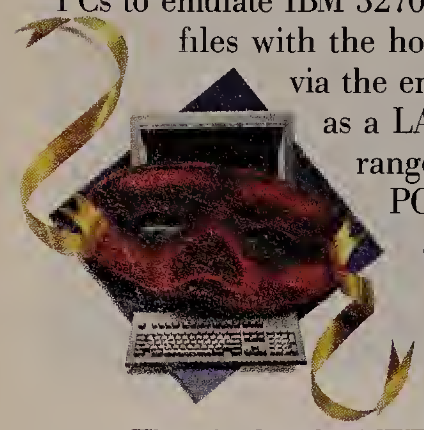

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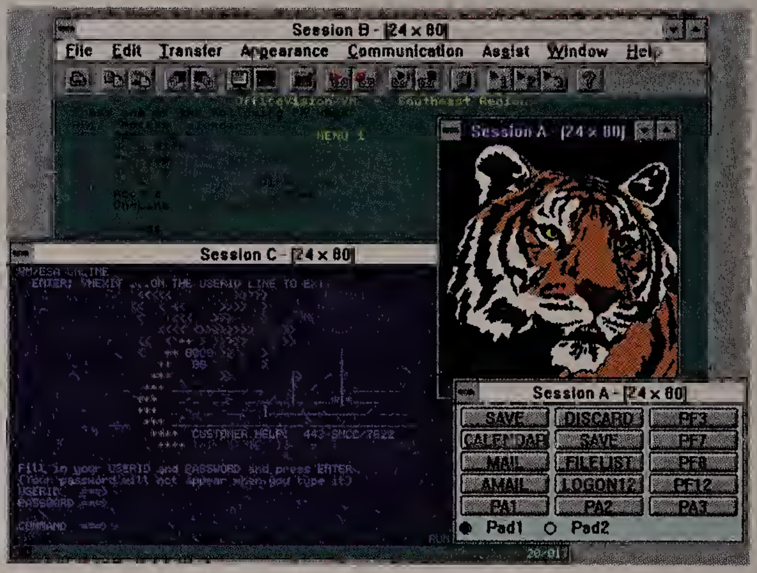

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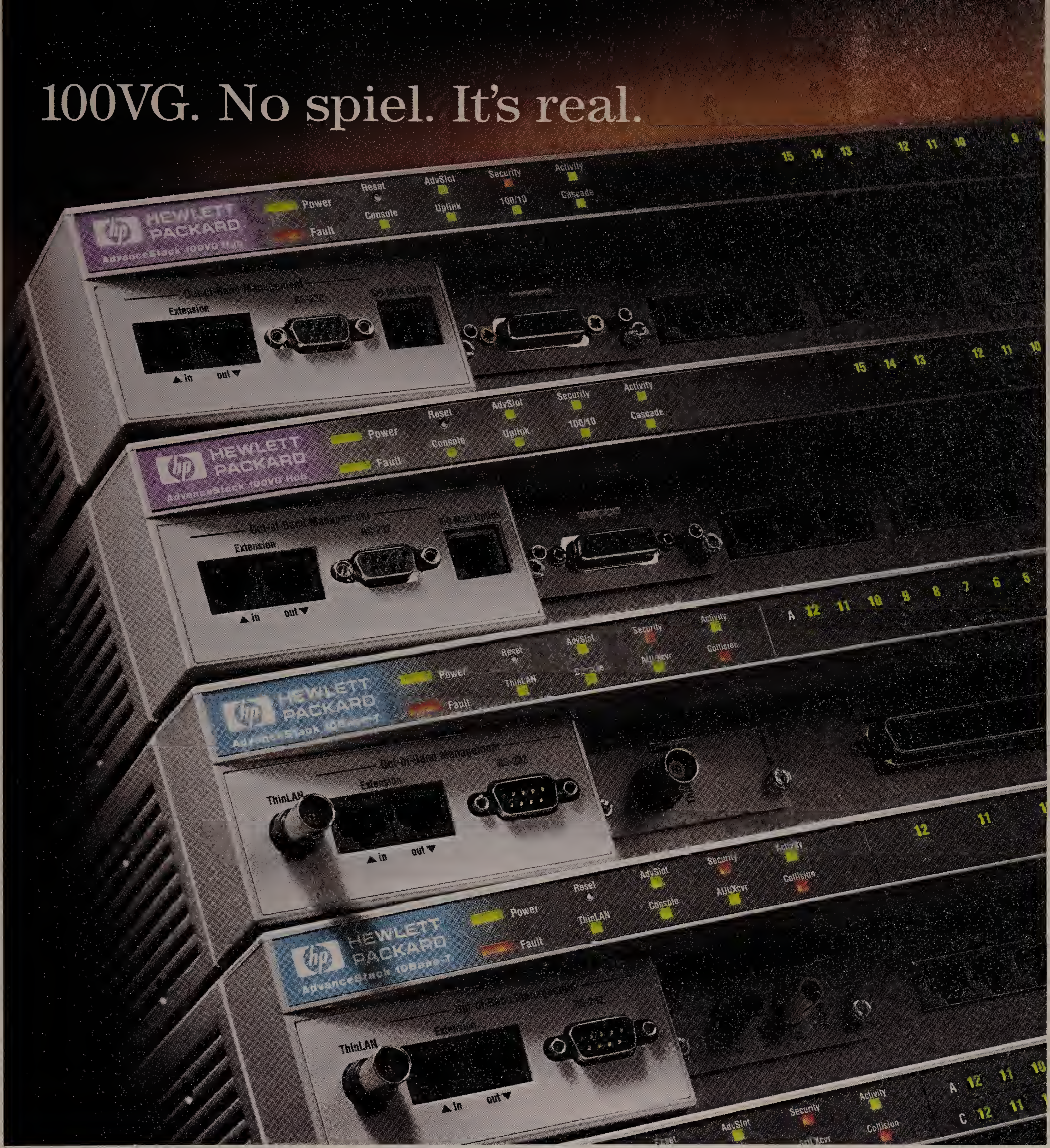

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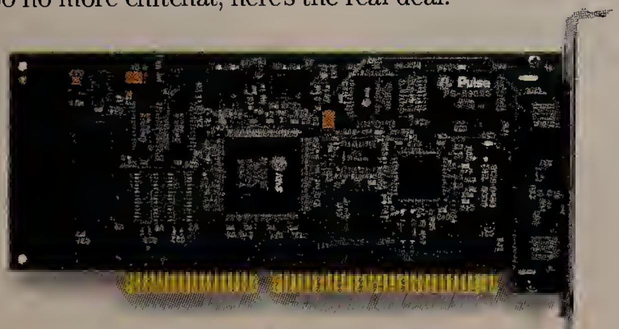

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Conn. public-safety agencies adopt CDPD

Communities band to negotiate for wireless.

BY ELLEN MESSMER

Groton, Conn.

A dozen public-safety agencies in Connecticut are outfitting police, fire and rescue vehicles with portable computers that can send and receive data over Bell Atlantic Mobile Systems, Inc. (BAMS) new Cellular Digital Packet Data network.

The Groton area police department spearheaded contract negotiations and network design for the shared service that will give as many as 500 users a wireless way to file electronic forms, message across agencies, and access federal and state law enforcement databases.

The three-year contract marks BAMS' first solid win for its CDPD public network service. The Groton police department chose the 19.2K bit/sec CDPD bid over a wireless data proposal from RAM Mobile Data because CDPD has twice the data throughput of RAM's wireless packet service.

FRANKLIN

"RAM has a good product, but CDPD is a lot faster," said Groton Police Chief Thomas Falvey. "We also found RAM didn't have sufficient coverage in our area."

Stamford, Conn.-based Software Corporation of America (SCA), BAMS' team partner on the project, has created an electronic version of the police department's complaint and accident forms to run on a Telepad, Inc. pen-based notebook computer mounted in each department vehicle.

Using the Telepad and a CDPD modem, Connecticut public-safety officials can wirelessly exchange forms or messages from their vehicles or desktops within 3 seconds.

An industry specification based on TCP/IP addressing, CDPD provides some measure of security by requiring automatic encryption of the airlink portion of the cellular packet data call. This makes CDPD more secure than Groton's easily intercepted police car radio broadcasts.

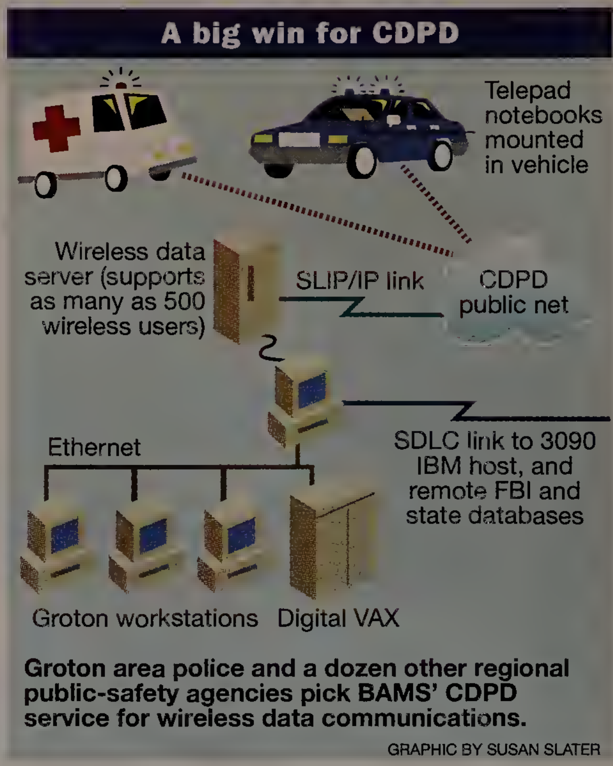
At the Groton police headquarters, SCA has installed a wireless data server (see graphic), which gives mobile vehicles a link to the department's 3090 mainframe, as well as state and Federal Bureau of Investigation networks, with access to motor vehicle registration and criminal record databases.

The dozen public-safety Connecticut agencies served under the same BAMS contract will share the wireless data server.

"In the past, if an officer needed this information, he had to call into the dispatch operation to get someone to pull the data and then relay it verbally," said Falvey. "This was a slow process and discouraged people from asking for what they needed."

The first Groton police vehicle equipped with CDPD began operating last week, and within four months, more than 400 other Connecticut public-safety vehicles are expected to have CDPD.

Around that time, an automatic vehicle location system built by Trimble Navigation, Inc. will be installed, which will allow the police department to share vehicle position information over the CDPD network and Ethernet-based workstations.


A big win for CDPD
Telepad notebooks mounted in vehicle
Wireless data server (supports as many as 500 wireless users)
SLIP/IP link
CDPD public net
Ethernet
SDLC link to 3090 IBM host, and remote FBI and state databases
Groton workstations
Digital VAX

Groton area police and a dozen other regional public-safety agencies pick BAMS' CDPD service for wireless data communications.

GRAPHIC BY SUSAN SLATER

PRICING ISSUES

Although BAMS initially wanted to charge on a per-packet basis for its CDPD service, Falvey and his negotiation team persuaded the carrier to give them a flat-rate fee. "Per-packet would have worked to limit officers' use," Falvey said.

The charge for the CDPD service is $100 per car per month. The cost for the wireless data server software and hardware, the client software, and the application development and installation is priced under $90,000.

If more client software is needed for additional vehicles in the future, the cost would be $400 per vehicle.

Mike Franklin, director of product development at BAMS, said the carrier will continue to try to win contracts via case-by-case pricing to organizations. "We have almost 30 trial customers testing CDPD," Franklin added.

Two of those customers, Visa USA of San Francisco and FirstNet Corp. of Dallas, are testing credit card authorization over CDPD using VeriFone, Inc. equipment at BAMS' Wireless Technology Laboratory in Bedminster, N.J., nicknamed the CDPD Greenhouse. ☒

ELECTRONIC COMMERCE

IBM offers users a quick peek at its Internet hand

BY ADAM GAFFIN

Washington, D.C.

IBM last week laid out its Internet product blueprint, adding World-Wide Web services and firewalls to previously announced plans to offer basic connectivity to the 'Net.

Due to roll out in the first quarter of next year, the new offerings will come from several IBM divisions and from Advantis, the value-added network co-owned by IBM and Sears, Roebuck and Co.

IBM, which made the announcements at the Internet World conference here, joins a growing number of vendors offering Web and other Internet services. In recent weeks, CompuServe, Inc., MCI Communications Corp. and UUNet Technologies, Inc. have all announced strategies for getting companies onto the World-Wide Web and the Internet. Last week, Digital Equipment Corp. announced a deal with Netscape Communications Corp. of Mountain View, Calif., to provide Web connectivity via Netscape Web server software running on Digital Alpha platforms.

The Advantis connectivity will not likely prove a big seller in the corporate world because most large enterprises already have an Internet pipe, according to Batson.

Use of the Web, which consists of Internet information resources connected via hyperlinks, has exploded over the past year with the development of graphical clients.

Analysts say there seems to be little to distinguish Web offerings, which typically include consulting on setting up Web sites, the hardware and software to run them, and connectivity to the Internet.

"They're all sort of scrambling for market share" in the new Web market, said Jayne Levin, editor of the "Internet Letter," a newsletter published here.

THE PLAN

Advantis President Gary Weis said that in the first quarter, the company will roll out connectivity options from 28.8K bit/sec dial-up and ISDN to 56K bit/sec, T-1 and T-3 leased-line access. He declined to provide specific prices but said they would be competitive with pricing from other Internet access providers. The service would be available across the U.S., he said.

Advantis will also team with the IBM Consulting Group and IBM's Integrated Systems Solution Corp. starting in the first quarter to offer a variety of Web-related services, from designing Web home pages to hosting them on secure servers at an Advantis server farm. No specific pricing was released.

The new Web service initially will lack a component for ensuring secure transactions. John Patrick, vice president of communications for the IBM Networking Software division, said IBM is still looking at several options, including public-key cryptography and Kerberos-based authentication systems. He said he hopes to have a solution in place within 90 days.

He added that IBM is working on a Windows-based Web client similar to the WebExplorer client shipping with the new version of OS/2.

Also under IBM's Internet plan is an AIX-based firewall, dubbed the NetSP Secured Network Gateway, due by year end. The gateway, based on software that IBM has used internally for seven years, includes support for authentication, packet filtering, proxies and a domain name server.

Pricing starts at $14,990 per license.

Jay Batson, senior analyst at Forrester Research, Inc., a Cambridge, Mass., market research firm, said the only unique thing IBM is bringing to market is its name and reputation. Batson said the Advantis connectivity will not likely prove a big seller in the corporate world because most large enterprises already have an Internet pipe.

SHOW TIME

At the Internet World show here, IBM introduced two customers of its new Web-based services. PC Flowers already sells flowers and related items via the IBM-Sears consumer network. Company President William Tobin said he will set up a similar service on Advantis-based Web servers in the first quarter of 1995.

Mecklermedia is relying on IBM for its MecklerWeb service. Earlier this year, Mecklermedia had partnered with Digital on the project but shelved it after just one week online when it could find only one company willing to pay a $25,000 start-up fee. The new MecklerWeb focuses on Mecklermedia's Internet World and virtual reality publications and trade shows, although company Chief Executive Officer Alan Meckler said the company will also sell space to other publishers.

Show attendee Jonathan Smalls, Internet administrator for Betac Corp., a defense contractor in Alexandria, Va., said he could not see any major differences among the various Internet and Web service offerings. If he can persuade senior management to get on the Web, price will probably be the deciding factor on vendor choice. ☒

INTERNET *tip*

BY ADAM GAFFIN

One in a series of occasional tips on Internet-based information services.

IBM on the Web

IBM runs a large Web service with information about its offerings. Resources include:

- ✓ **Technical specifications**
- ✓ **Pricing information**
- ✓ **Press releases**

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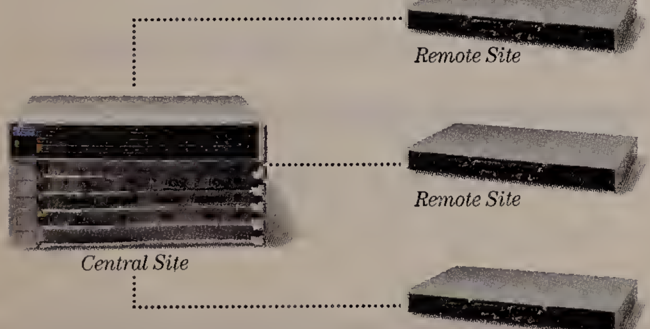

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- Routing protocols: RIP, OSPF
- WAN support: Point-to-Point (PPP); ISDN; dial-up; X.25; Frame Relay; SMDS
- "Instant-On" automatic installation for remote sites
- HP OpenView-based management tools to keep internal support costs to a minimum (with choice of Windows™, NT, or UNIX® platforms)
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- HP EASE integrated LAN/WAN network sampling for comprehensive information on network performance and availability

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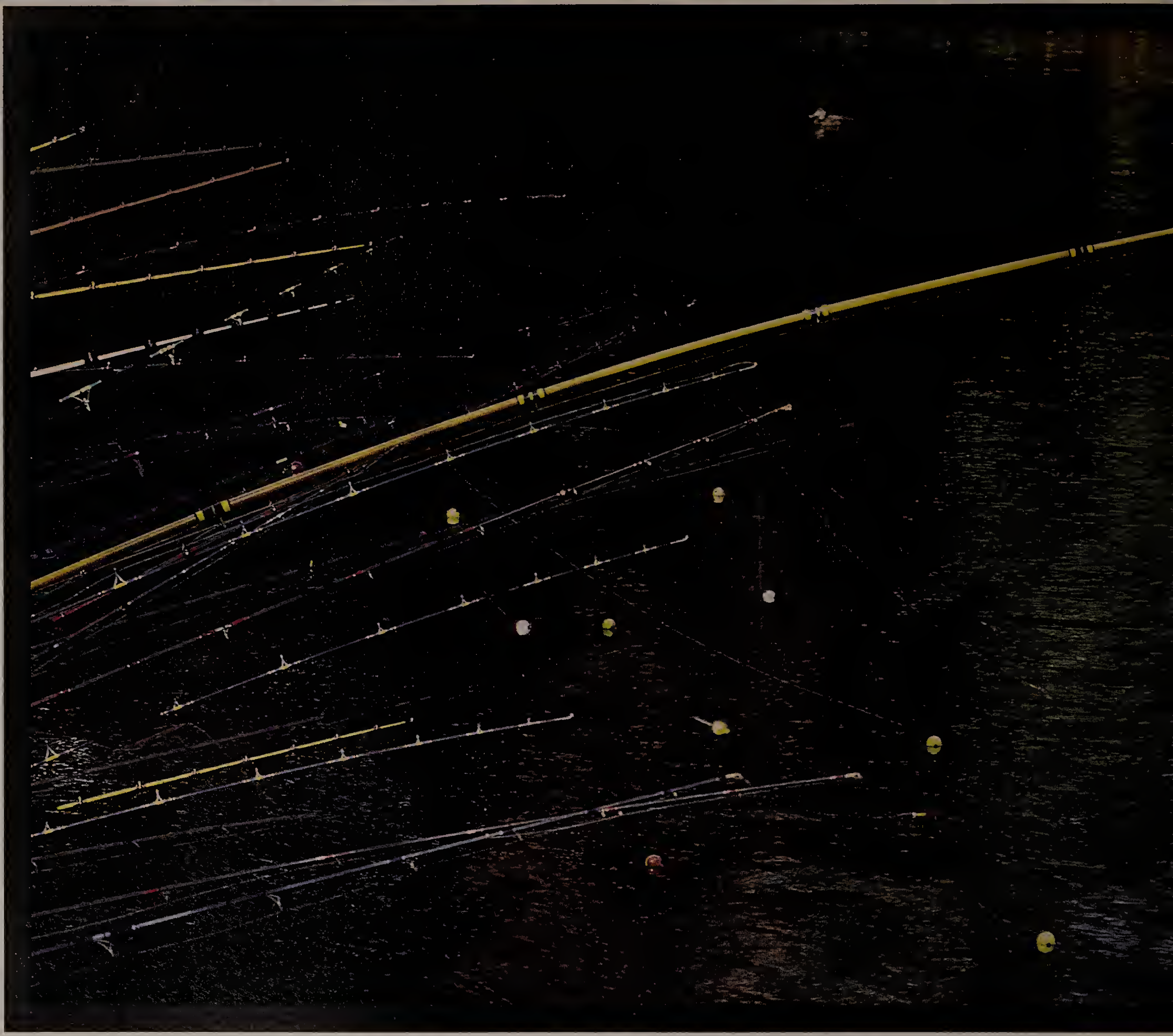

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NETWORK WORLD

The Newsweekly of Enterprise Network Computing

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If government, please specify division: ______________________________

1 Industry: (check one only)

- 01. ☐ Manufacturers (other)
- 02. ☐ Finance/Banking
- 03. ☐ Insurance/Real Estate/Legal
- 04. ☐ Healthcare Services
- 05. ☐ Hospitality/Entertainment/ Recreation
- 06. ☐ Media/TV/Cable/Radio/Print
- 07. ☐ Retail/Wholesale Trade/Business Services
- 08. ☐ Transportation
- 09. ☐ Utilities
- 10. ☐ Education
- 11. ☐ Process Industries (Mining/Construction/ Petroleum Refining/ Agriculture/Forestry)
- 12. ☐ Government Federal/State/Local
- 13. ☐ Military
- 14. ☐ Aerospace
- 15. ☐ Consultants (Independent)
- 16. ☐ Carriers/Interconnects
- 17. ☐ Manufacturers (Computer/ Communications)
- 18. ☐ Systems/Network Integrators (VAR/VAD/ VAN/Systems/Software Houses)
- 19. ☐ Distributors Communications/ Computers
- 20. ☐ Other______________

2 What is your Job Function? (check one only)

NETWORK IS Management:

- 1. ☐ Networking Management
- 2. ☐ LAN Management
- 3. ☐ Datacom/Telecom Management
- 4. ☐ IS,IT,MIS,Systems Management
- 5. ☐ Engineering Management
- 6. ☐ Corporate Management (CIO,CEO,PRES,VP, DIR,MGR,Financial Management)
- 7. ☐ Consultant (Independent)
- 8. ☐ Other______________

3 What is the total number of sites for which you have purchase influence? (check one only)

- 1. ☐ 100+
- 2. ☐ 59 - 99
- 3. ☐ 20 - 49
- 4. ☐ 10 - 19
- 5. ☐ 2 - 9
- 6. ☐ 1
- 7. ☐ None

4 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. SCOPE (check one only)

- 1. ☐ Corporatewide
- 2. ☐ Multienterprise
- 3. ☐ Departmental
- 4. ☐ None

B. INVOLVEMENT (check all that apply)

- 1. ☐ Recommend/Specify
- 2. ☐ Approve
- 3. ☐ Evaluate
- 4. ☐ Determine the need
- 5. ☐ None

5 Check ALL that apply in columns A and B:

A: I am involved in the purchase of the following products/services.
B: I plan to purchase the following products/services.

A B
☐ 100 ☐ **LOCAL AREA NETWORKS**
☐ 01. ☐ Local Area Networks
☐ 02. ☐ Network Operating Systems Software (NOS)
☐ 03. ☐ LAN Storage Devices (optical, tape, disk, etc.)
☐ 04. ☐ LAN Backup Systems (optical, tape, disk, etc.)
☐ 05. ☐ Network Test Equipment/Diagnostic/ Management Software
☐ 06. ☐ Hubs/Intelligent Hubs
☐ 07. ☐ Cables, Connectors, Baluns
☐ 08. ☐ UPS
☐ 09. ☐ Network Adapter Boards/Network Interface Cards
☐ 10. ☐ Peer-to-Peer LANs
☐ 11. ☐ Wireless Networks
☐ 12. ☐ SNMP Network Management
☐ 13. ☐ ATM Switches
☐ 14. ☐ Remote LAN Access
☐ 15. ☐ Ethernet Switches
☐ 16. ☐ LAN Servers
☐ 17. ☐ Superservers
☐ 18. ☐ Remote Access/Communications Servers

A B
☐ 101 ☐ **REMOTE/WIRELESS COMPUTING**
☐ 19. ☐ Laptops
☐ 20. ☐ Notebooks
☐ 21. ☐ PDAs
☐ 22. ☐ PCMCIA
☐ 23. ☐ Mobile Data Services
☐ 24 ☐ Wireless Data Services
☐ 25. ☐ Wireless Data Equipment

A B
☐ 102 ☐ **INTERNETWORKING**
☐ 26. ☐ Bridges
☐ 27. ☐ Routers
☐ 28. ☐ Gateways
☐ 29. ☐ Bridge/Routers

A B
☐ 103 ☐ **COMPUTERS/PERIPHERALS**
☐ 30. ☐ Micros/PCs
☐ 31. ☐ Minis
☐ 32. ☐ Mainframes
☐ 33. ☐ Workstations
☐ 34. ☐ Front-End Processors
☐ 35. ☐ Terminals
☐ 36. ☐ Printers
☐ 37. ☐ Cluster Controllers
☐ 38. ☐ Fax Machines
☐ 39. ☐ Monitors

A B
☐ 104 ☐ **SOFTWARE/APPLICATIONS**
☐ 40. ☐ Network Management
☐ 41. ☐ Systems Management
☐ 42. ☐ Micro to Mainframe
☐ 43. ☐ Security
☐ 44. ☐ Communication/Terminal Emulation
☐ 45. ☐ Word Processing
☐ 46. ☐ Operating Systems
☐ 47. ☐ Client Server Applications Development

A B **SOFTWARE/APPLICATIONS (cont'd)**
☐ 48. ☐ Applications Development
☐ 49. ☐ Data Base Management/RDBMS
☐ 50. ☐ Spreadsheet
☐ 51. ☐ Groupware
☐ 52. ☐ EDI
☐ 53. ☐ E-Mail
☐ 54. ☐ Windows/Graphical User Interface
☐ 55. ☐ 4GL Development/Case
☐ 56. ☐ Multimedia
☐ 57. ☐ Graphics/DTP
☐ 58. ☐ Remote Access
☐ 59. ☐ Imaging
☐ 60. ☐ Suites
☐ 61. ☐ Middleware
☐ 62. ☐ Document Management

A B
☐ 105 ☐ **WIDE AREA NETWORKS EQUIPMENT & SERVICES**
☐ 63. ☐ Modems (9.6K bps and over)
☐ 64. ☐ Modems (under 9.6K bps)
☐ 65. ☐ T-1/T-3 Multiplexers
☐ 66. ☐ T-1/T-3 Services
☐ 67. ☐ Inverse Multiplexers
☐ 68. ☐ Fractional T-1
☐ 69. ☐ SMDS
☐ 70. ☐ ATM (Asynchronous Transfer Mode)
☐ 71. ☐ Matrix Switches
☐ 72. ☐ Packet Switches
☐ 73. ☐ Protocol Converters
☐ 74. ☐ Diagnostic/Test Equipment
☐ 75. ☐ DSU/CSU
☐ 76. ☐ Microwave
☐ 77. ☐ Fax Boards/Modems
☐ 78. ☐ VSAT
☐ 79. ☐ Fiber Optic
☐ 80. ☐ Satellite
☐ 81. ☐ ISDN
☐ 82. ☐ PBXs (over 1000 lines)
☐ 83. ☐ PBXs (under 1000 lines)
☐ 84 ☐ Automatic Call Distributors
☐ 85. ☐ Voice Messaging Systems
☐ 86. ☐ Videoconferencing/Teleconferencing
☐ 87. ☐ Voice Response/Processing
☐ 88. ☐ Dedicated Leased Line
☐ 89. ☐ Switched Data
☐ 90. ☐ E-Mail/Online Services
☐ 91. ☐ Image Processing
☐ 92. ☐ 800/900 Services
☐ 93. ☐ WATS/MTS
☐ 94. ☐ International
☐ 95. ☐ Virtual Networks
☐ 96. ☐ Frame Relay
☐ 97. ☐ Value Added Services
☐ 98. ☐ CIT (Computer-Integrated Telephony)

☐ 99. ☐ None of the above (1-98)

6 What is the total number of LANS, Workstations/Nodes: At this Location/ In your Organization?

At This Location:	LANs		Workstations/ Nodes	Entire Organization:	LANs		Workstations/ Nodes
1.	☐	5000+	☐	1.	☐	5000+	☐
2.	☐	1,000 - 4,999	☐	2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐	3.	☐	100 - 999	☐
4.	☐	50 - 99	☐	4.	☐	50 - 99	☐
5.	☐	10 - 49	☐	5.	☐	10 - 49	☐
6.	☐	9 or less	☐	6.	☐	9 or less	☐
7.	☐	None of the above	☐	7.	☐	None of the above	☐

7 Check ALL that apply in columns A and B:

A: The following network platforms are currently installed.
B: The following network platforms are currently planned.

A B
☐ 55 ☐ **NETWORK ARCHITECTURES**
☐ 01. ☐ SNA
☐ 02. ☐ DECNET
☐ 03. ☐ MAP/TOP
☐ 04. ☐ TCP/IP
☐ 05. ☐ DCA (Unisys)
☐ 06. ☐ X.25
☐ 07. ☐ Novell IPX/SPX
☐ 08. ☐ APPC/APPN/LU6.2
☐ 09. ☐ NETBIOS
☐ 10. ☐ OSI
☐ 11. ☐ APPLETALK
☐ 12. ☐ NSF
☐ 13. ☐ XNS
☐ 14. ☐ OTHER______________

A B
☐ 56 ☐ **NETWORK OPERATING SYSTEM**
☐ 15. ☐ LOCALTALK (APPLETALK)
☐ 16. ☐ BANYAN (VINES)
☐ 17. ☐ DCA (IRMALAN)
☐ 18. ☐ DCA (10-NET)
☐ 19. ☐ IBM (LAN SERVER)
☐ 20. ☐ IBM (PC LAN PROGRAM)
☐ 21. ☐ MICROSOFT (LAN MANAGER)
☐ 22. ☐ NOVELL (NETWARE, 2X, 3X, 4X)
☐ 23. ☐ PROTEON (PRONET)
☐ 24. ☐ 3COM (3+, 3+OPEN)
☐ 25. ☐ ARTISOFT (LANTASTIC)
☐ 26. ☐ HAYES (LANSTEP)
☐ 27. ☐ DEC (PATHWORKS)
☐ 28. ☐ WINDOWS NT/ADVANCED SERVER
☐ 29. ☐ OTHER

A B
☐ 57 ☐ **LAN ENVIRONMENT**
☐ 30. ☐ 4M TOKEN RING
☐ 31. ☐ 16M TOKEN RING
☐ 32. ☐ ARCNET
☐ 33. ☐ ETHERNET
☐ 34. ☐ 100 M ETHERNET
☐ 35. ☐ STARLAN
☐ 36. ☐ FDDI
☐ 37. ☐ LOCAL TALK
☐ 38. ☐ 10BASE-T
☐ 39. ☐ ATM
☐ 40. ☐ OTHER______________

A B
☐ 58 ☐ **COMPUTER OPERATING SYSTEM**
☐ 41. ☐ DOS
☐ 42. ☐ UNIX/XENIX/AIX
☐ 43. ☐ OS/2
☐ 44. ☐ OS/2.X
☐ 45. ☐ IBM MVS
☐ 46. ☐ IBM VM
☐ 47. ☐ DIGITAL VMS
☐ 48. ☐ MACINTOSH
☐ 49. ☐ WINDOWS
☐ 50. ☐ WINDOWS NT
☐ 51. ☐ X WINDOWS
☐ 52. ☐ SOLARIS
☐ 53. ☐ OTHER______________

☐ 54. ☐ None of the above (1-53)

8 For which areas outside of the U.S. do you have purchase influence? (check all that apply)

- 1. ☐ Europe
- 2. ☐ Asia
- 3. ☐ South America
- 4. ☐ Australia
- 5. ☐ Middle East
- 6. ☐ None

9 Which of the following hardware platforms are installed/planned in your company? (check all that apply)

	Mainframes		Minis			Mainframes		Minis	
	Installed	Planned	Installed	Planned		Installed	Planned	Installed	Planned
01. IBM	☐	☐	☐	☐	06. DATA GENERAL	☐	☐	☐	☐
02. DIGITAL	☐	☐	☐	☐	07. HP	☐	☐	☐	☐
03. AMDAHL	☐	☐	☐	☐	08. TANDEM	☐	☐	☐	☐
04. AT&T	☐	☐	☐	☐	09. UNISYS	☐	☐	☐	☐
05. BULL HNIS	☐	☐	☐	☐	10. OTHER__________	☐	☐	☐	☐

Which of the following do you have installed/planned: (USE NUMBERS ONLY)

	At This Location		Entire Organization	
	Servers	Clients/Nodes	Servers	Clients/Nodes
11. POWER MACINTOSH				
12. MACINTOSH OTHER				
13. POWER PC BASED				
14. PENTIUM BASED				
15. 80486 BASED				
16. 80386 BASED				
17. 80286 BASED				
18. 80806/80808 BASED				
19. ALPHA BASED				
20. RISC/UNIX BASED WORKSTATIONS				
21. OTHER				

10 What is the estimated value of networking equipment and services that you help specify, recommend or approve annually? (check one only)

- 01. ☐ $100 million and over
- 02. ☐ $50 - $99.9 million
- 03. ☐ $25 - $49.9 million
- 04. ☐ $20 - $24.9 million
- 05. ☐ $10 - $19.9 million
- 06. ☐ $5 - $9.9 million
- 07. ☐ $1 - $4.9 million
- 08. ☐ $500,000 - $999,999
- 09. ☐ $499,999 or less
- 10. ☐ None of the above

11 Estimated gross annual revenues of your entire company/institution: (check one only)

- 1. ☐ Over $10 billion
- 2. ☐ $1 to $9.9 billion
- 3. ☐ $500 to $99.9 million
- 4. ☐ $100 to $499.9 million
- 5. ☐ $50 to $99.9 million
- 6. ☐ $10 to $49.9 million
- 7. ☐ $5 to $9.9 million
- 8. ☐ $4.9 million or less
- 9. ☐ None of the above

12 Estimated number of employees: At This Location/In Entire Organization.

At This Location:

- 1. ☐ Over 10,000
- 2. ☐ 5,000 - 9,999
- 3. ☐ 2,500 - 4,999
- 4. ☐ 1,000 - 2,499
- 5. ☐ 500 - 999
- 6. ☐ 499 or less

Entire Organization:

- 1. ☐ Over 10,000
- 2. ☐ 5,000 - 9,999
- 3. ☐ 2,500 - 4,999
- 4. ☐ 1,000 - 2,499
- 5 ☐ 500 - 999
- 6. ☐ 499 or less

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ENTERPRISE INTERNETS

Data Network Architectures, Standards, Equipment and Management

Firewalls protect 'Net users from security burns

Q&A Corporations that do business on the Internet will need to take a look at various security measures to ward off unauthorized entry while giving legitimate users access to corporate resources.

One such measure that is becoming increasingly popular is to build a firewall. John Mayes, president of Palo Alto, Calif.-based consultancy John Mayes & Associates, which specializes in Internet firewalls for business communications, talked with *Network World* Senior Washington correspondent Ellen Messmer about firewall terms, practices and products.

What is a firewall?

A firewall is a set of hardware and software that allows your organization access to the resources of the Internet while deterring an unwanted access from the Internet into your organization.

What kinds of firewalls are there?

There are two general schools of thought on firewalls: the packet-level security model and the application-level model. A packet-level gateway allows complete control over inbound and outbound packets and allows corporate users full access to the Internet. An application-level firewall — typically a Unix host with one network interface facing the public Internet and one facing the internal corporate LAN — monitors specific applications like telnet or FTP.

– John Mayes

> **"[Homegrown application-layer firewalls] can be a maintenance nightmare because when one of your daemons gets new features, there's a good possibility your client-end software will have to change."**

A packet-level firewall is normally based on a router, although Checkpoint Software has a product, Firewall 1, based on a Unix box. The router firewall contains access lists that specify exactly what type of packets can go where based on a number of characteristics, such as source or destination IP address and ports.

Which is better, application- or packet-level security?

This a hotly debated issue. Properly implemented, both can provide good security. Application-level security usually involves multiple Unix host daemons, such as a telnet relay daemon that works with specially adapted client programs. The host daemon is a help program, and the client software makes a connection to it. The daemon sets up the connection to the

See Firewalls, *page 20*

MIC falls behind but says progress made

Three-month lag doesn't dampen hopes for de facto management repository.

BY JIM DUFFY

Columbia, Md.

The Management Integration Consortium (MIC) is reporting slow but steady progress in its effort to define a set of vendor-neutral management data repository standards.

MIC, which was formed in May by a number of network and systems management vendors, is about three months behind its schedule in defining a schema for storing and accessing management data in an SQL database, said Jim Corrigan, MIC chairman and president of Ki Networks, Inc. The group is also defining a common format for information to be stored in the database, such as event, topology, asset and historical data (*NW*, April 11, page 1).

Nonetheless, the group is committed to completing much of its work by the end of the first quarter, Corrigan said. The goal is to produce software code that, the organization hopes, will become de facto standard technology for storing and accessing management information.

MIC's strategy differs from that of standards bodies that spend years deliberating on specifications for multivendor computing, communications and management. MIC intends to move much faster by using technology already in the market.

That's analogous to what the Open Software Foundation, Inc. attempted to do with its all-encompassing Distributed Management Environment framework, but MIC's scope is much narrower.

"There's no way you can come up with a global architecture and be successful because the globe changes too quickly," Corrigan said. "Our philosophy is build it, see what comes from it, make the corrections and build it even better."

To date, MIC's Data Integration working group has completed an initial draft of a Meta-Schema for the database and is currently reviewing it internally. Based on technological contributions from several MIC members — including AT&T, Hewlett-Packard Co. and IBM — the Meta-Schema defines a common way for management applications and platforms to share management data.

Meanwhile, the MIC's Event Management working group has also made some

See MIC, *page 20*

MIC's progress to date

Data Integration
- The first draft of the Management Integration Consortium (MIC) Meta-Schema has been distributed and is in review for comments.

Event Management
- Work is under way to implement a public version of the Network Management Forum's OME specification.

Historical Data
- Two possible schemata have been submitted and are under review.

Asset Management
- Group is reviewing the Meta-Schema for applicability to asset management.

GRAPHIC BY TERRI MITCHELL

BRIEFS

Digital Communications Associates, Inc. last week rolled out a suite of software that bundles its **3270 and 5250 terminal emulation** products in one package designed to give Microsoft Corp. Windows and Apple Computer, Inc. Macintosh users simultaneous access to mainframe, mid-range and Unix host resources.

Irma Suite combines DCA's previously separate Irma for AS/400, Irma for Mainframe and Irma for Open Systems in a single package.

Irma Suite for Windows 3.1 supports seven simultaneous host sessions, but the Windows 95 and Macintosh versions are limited only by the memory in the machine. Irma Suite products are available through March for a special price of $250.

DCA: (800) 348-3221.

IBM announced last week that as of Jan. 27 its **AIX SNA Server/6000** gateway platform will be packaged according to number of users, rather than today's one-price-fits-all plan.

The SNA Server/6000 gateway will now be available in a one- to 16-user version for $1,000. A 17- to 64-user and an unlimited-user package will cost $2,000.

IBM: (800) 426-2255.

Compatible Systems Corp. last week said it will add frame relay software to its **MicroRouter** line of remote access routers next month.

This will give users the choice of connecting to remote networks through either the Point-to-Point Protocol or via **frame relay** services.

MicroRouters are priced from $995 to $1,695.

Compatible: (800) 356-0283.

TyLink steps up to bat with its integrated access device

BY MICHAEL CSENGER

Norton, Mass.

TyLink Corp. today will join a handful of other vendors offering integrated access devices that support a mix of packet-based, leased-line, dial-up and inverse multiplexed connections on a single platform.

TyLink's 7400 WAN Champion marks the company's move up from selling separate data service unit/channel service unit and inverse multiplexing equipment, although much of the same underlying technology is being integrated as modules in the new offering.

Like other integrated access devices, the 7400 WAN Champion lets users take advantage of new service offerings and rate changes, or adapt to changing network needs without having to replace their access nodes. Different services are supported by various modules, which can be swapped and added to the chassis as needed. A single access link to the carrier can support a mix of different services, avoiding the cost of multiple access charges.

The device has 16 slots on either side of its Tri-Bus midplane. The front slots can be filled with Communications Modules that support features and WAN services such as inverse multiplexing, Asynchronous Transfer Mode, ISDN, T-1, T-3 and 56K bit/sec dial-up or leased lines. The rear slots hold interface modules for user data and voice ports.

The Tri-Bus midplane has three buses supporting different traffic types. The Multiplexer Bus carries low-speed traffic over 16 separate 8M bit/sec channels. It is used to interconnect different modules, serving as a digital cross-connect, and to aggregate traffic

See TyLink, *page 22*

Reality ✓ Check

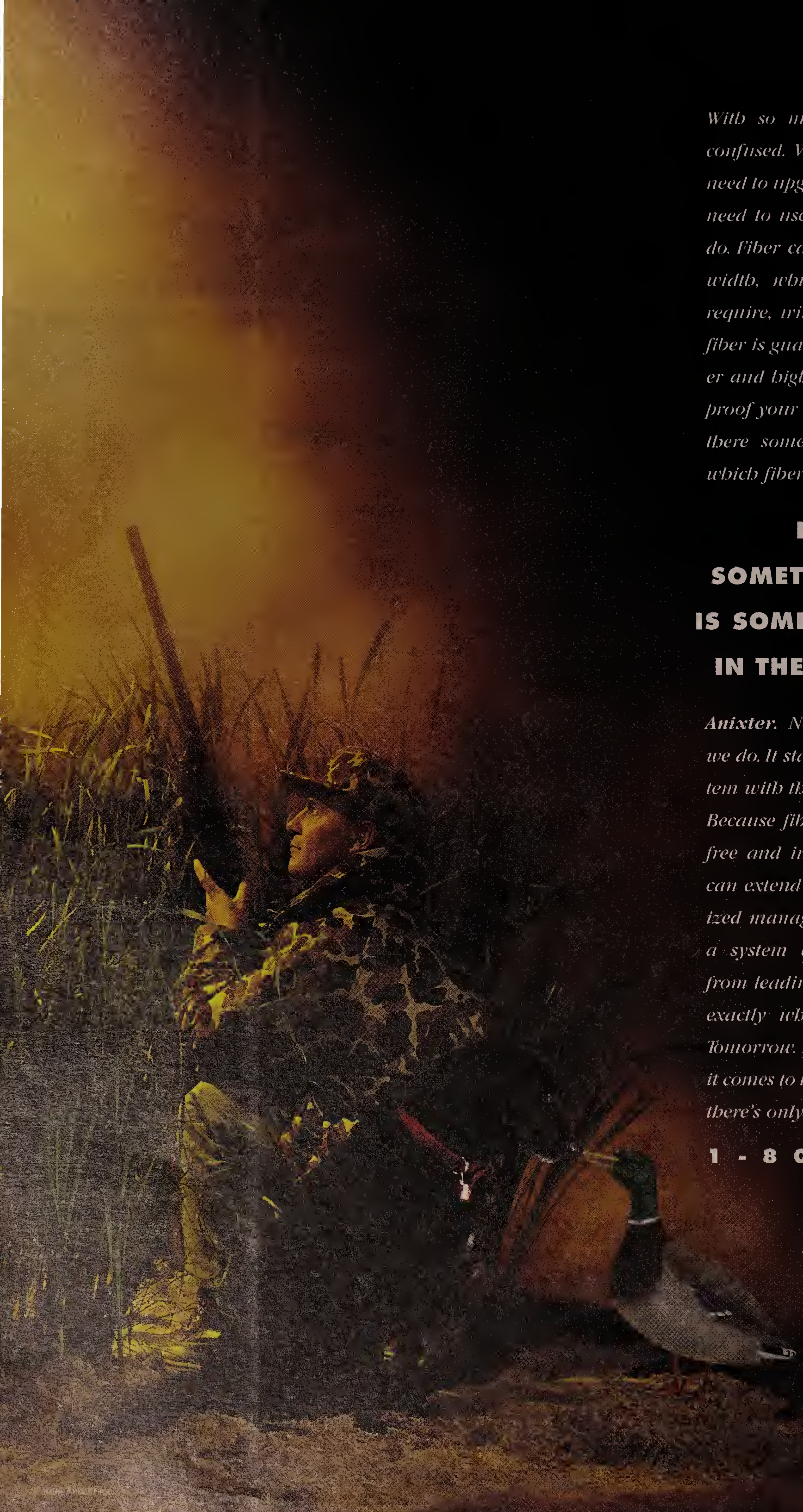
Product: 7400 WAN Champion
Company: TyLink

The benefits:
- Mix of WAN services supported, including ISDN, T-1, T-3 and 56K bit/sec lines.
- Supports link to multiple carrier services via single access line.
- Modular design simplifies changes.

The drawbacks:
- T-1, T-3 and OC-3 ATM modules are not due until second half of 1995.
- No frame relay FRAD module yet planned.

The analyst view:
"These are [good for] regional offices. A small site probably doesn't need T-1 connectivity, while the large corporate sites already have their private T-1 multiplexers installed."

Kathryn Korostoff



With so many choices, it's easy to get confused. Very confused. You know you need to upgrade your network, but do you need to use fiber? Chances are good you do. Fiber can handle the increased bandwidth, which sophisticated applications require, with greater reliability. And only fiber is guaranteed to accommodate higher and higher data speeds to help future-proof your network. Sounds simple, but is there someone who really understands which fiber is best for your network?

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IN THE RIGHT DIRECTION.

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Circle Reader Service #26

Data Switch intros device to extend ESCON over T-3 lines

BY MICHAEL COONEY

Shelton, Conn.

Data Switch Corp. last week announced a device that lets users extend mainframe channels at least 40 miles over leased T-3 lines.

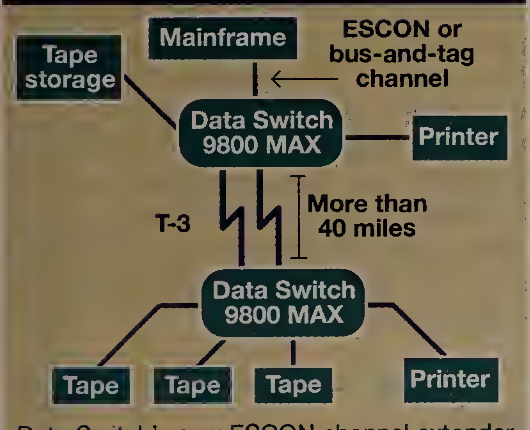
The Data Switch Model 9800 Multiple Architecture Extender (MAX) allows users of IBM Enterprise Systems Connectivity (ESCON) and copper bus-and-tag channels to set up remote tape storage farms and disaster recovery facilities.

ESCON is IBM's high-speed, fiber-optic channel architecture that supports mainframe channel access at speeds up to 17M byte/sec. It supports distances of almost 2 miles between a mainframe and controllers or other peripheral devices, up from a limit of 400 feet with the 4.5M byte/sec copper bus-and-tag channels.

IBM also offers the ESCON Extended Distance Feature (XDF), which supports distances of almost 26 miles between controllers and the mainframe. But Data Switch's 9800 MAX stretches that limit by at least 14 miles.

"Without the 9800, users would have needed another mainframe at the remote site to handle the channel-to-channel communications necessary to complete the long-distance connection between the data center and the remote storage units," said Jim Gerrity, product manager at Data Switch.

Extending the channel



Data Switch's new ESCON channel extender helps users set up remote storage farms and disaster recovery facilities by extending mainframe channels more than 40 miles over T-3 lines.

GRAPHIC BY SUSAN J. CHAMPENEY

With the 9800 MAX, users can attach as many as four ESCON channels, eight parallel bus-and-tag channels or a mix of the two.

On the wide-area side, the 9800 MAX supports two T-3 speed links between pairs of 9800s or up to four T-1 links. It also offers a High Speed Serial Interface, which supports any speed up to 53M bit/sec.

In the event of a line failure, the 9800 MAX automatically diverts traffic from the failed line to a second circuit.

For connectivity requirements within buildings or within a limited geographic area, the 9800 MAX can be configured with a multimode or single-mode private fiber interface. That lets users "channelplex" as many as eight channels, supporting a total of 106M byte/sec throughput onto a single fiber pair, Gerrity said.

With ESCON channels, the 9800 MAX works by converting incoming fiber-optic signals into an electronic signal for transmission over phone lines.

A second 9800 MAX converts the electronic signal back into ESCON format, and the data is passed along to its destination.

The box can be monitored, but not controlled, by IBM's host-based NetView management system. The control capability will come in a later release, Gerrity said.

Other channel extension vendors, such as Network Systems Corp. and Computer Network Technology Corp. support high-speed channel extension, but not for ESCON channels.

"There's a lot of open space in the ESCON channel extension market because there are few tools to do it," said Anura Guruge, an independent analyst based in New Ipswich, N.H. "This product should make it easier for users to access physically remote resources."

Gerrity also noted that EMC Corp.'s new Symmetrix Remote Data Facility, which lets users mirror data and applications across separate sites, will be the first application to run on the new box.

EMC's Symmetrix product runs on its Cached Disk Array 5000 storage line. Symmetrix lets storage devices back up mainframe data locally and immediately transmit a mirror image to a remote storage device for safekeeping (*NW*, Oct. 10, page 17). According to EMC executives, the ability to mirror backup data and transmit via high-speed lines to a storage device at a remote site over unlimited distances will ultimately reduce costs and bring faster restoration of data centers in the event of disaster.

The 9800 MAX is available for prices starting at $150,000.

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*Circle Reader Service #***32**

MIC

Continued from page 17

progress. Two members of the group — Ki and Network Managers, Ltd. — are looking to write code to the Network Management Forum's Open Management Edge (OME) specification and distribute it over the Internet to spur widespread adoption.

Using a protocol engine and a request broker, OME allows applications to share data, regardless of the protocols or call routines they use (*NW*, Sept. 6, 1993, page 1).

In event management, for example, OME-compliant applications could issue messages to the request broker seeking event information on a faulty device. Once the broker locates that information, it would use OME's protocol engine to engage the transport protocol or call routine necessary to communicate back and forth with that device.

The Historical Data working group, meanwhile, has received two schemata, both drafted by AT&T, HP and SAS Institute, Inc., for a common way to format historical trend data from management systems, applications and other tools. The documents are being reviewed by the working group.

And the Asset Management working group is reviewing the Meta-Schema to determine its applicability to network and system asset and inventory management.

Although MIC has made some progress despite its three-month lag, some observers believe the group's work might be further slowed by the departure of former Chairman Eric Olinger. Olinger recently resigned from that position following his departure from Peregrine Systems, Inc., where he was a product author.

"These things take a fair amount of extra-curricular energy to pull off," said Jill Huntington-Lee, a principal analyst at Brandywine Network Associates in Cinnaminson, N.J. "Since [Olinger] has been willing to put in extra time to do this, it's going to be hard for other people to pick up the slack."

Corrigan, who as MIC secretary was next in line to assume the chairmanship, dismissed the notion, saying that Olinger's departure has instead galvanized MIC's efforts to quickly build on what he accomplished. ☒

Comments?

See "How to reach us" on the back page.

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Circle Reader Service #46

Firewalls

Continued from page 17

Internet to let the user reach another company's firewall where he might be allowed FTP transfer at that company, for example.

There is freeware that users can download from the Internet to build their own firewall, but commercially sold products exist, too. What approach should users take?

There is freeware for packet- and application-layer security. To build an application firewall yourself, you have to decide what services to provide to your users and then find all the proper daemons for that service. For each application, you have to have special client software for each service you wish to support in each PC, Macintosh or Unix workstation. This can be a maintenance nightmare because when one of your daemons gets new features, there's a good possibility your client-end software will have to change. If you're really knowledgeable about what you're doing, you could build your own. But it has to be done exactly right, or you will have a security hole.

Can you recommend any specific freeware?

For packet-layer security, there is Screend. For application-layer, there is Trusted Information Systems, Inc.'s (TIS) Firewall Toolkit and another by the name of Socks. The software can be downloaded from places like gatekeeper.dec.com, stp.tis.com and stp.nec.com. The TIS public domain software has a special telnet gateway that users connect to first, which then makes the connection to the telnet daemon and eliminates the need for special client software at each computer. But the downside is you can't use your special graphical user interface software because it isn't tailored to run with the gateway.

What commercial products are out there?

Livingston Enterprises, Inc. in Pleasanton, Calif., sells a firewall router. For an application-layer firewall, there's Digital Equipment Corp.'s Seal product. It's the Cadillac of firewalls, but it costs $50,000 and up. There's also the TIS Gauntlet, and Sun Microsystems, Inc. is now coming out with Netra.

A product I developed, the Network Internet Exchange, handles IP address translation as its primary task, but it also works with a firewall as an added safeguard to prevent hacker entry if an application-layer gateway is compromised. ☒

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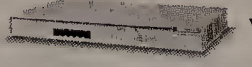

LinkSwitch hub

How to switch.

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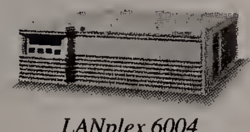
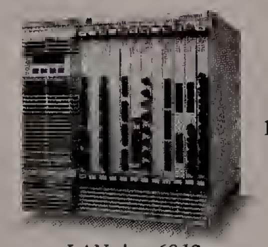


LANplex 6004

When to switch.

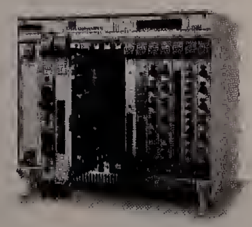
Now. Because you can immediately make better use of your network.



LANplex 6012

Where to switch.

Many times it's where you're currently routing. You may need both.



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Circle Reader Service #38

Adtran rolling out ISDN inverse mux

BY MICHAEL CSENGER

Huntsville, Ala.

Adtran, Inc. will introduce next month an ISDN inverse multiplexer that gives users a low-cost alternative to fractional T-1 services.

The ISDN Service Unit (ISU) 512 will inverse multiplex as many as four ISDN Basic Rate Interface connections to support a single data link at up to 512K bit/sec, said William Salmon, Adtran's product manager.

"We've had demand from customers who can't get a fractional T-1 because it's too expensive, but they need more than switched 56 or [128K bit/sec] BRI for the data they have to send," Salmon said.

With BRI connections costing as little as $30 per month in some areas, multiplexing several of them together can be an economical solution. Hardware costs are also less compared to T-1 data service units/channel service units and interfaces for fractional T-1 service, Salmon said.

The ISU 512 will have just one data port for user traffic. Many single-BRI products announced recently for telecommuters and small offices support multiple ports for voice and data multiplexing, but this device serves a different need.

"Especially for business applications, people are looking at ISDN for single-use applications," said Bob Larribeau, president of Larribeau Associates, Inc., a San Francisco-based consultancy specializing in ISDN.

"People at home want to squeeze the most value they can from a single box, but when you're more data-intensive, you look to support single applications," Larribeau said. He noted that in his home office he uses two separate BRI connections for voice and data.

The standard rule of thumb for comparing leased-line to dial-up costs suggests that more than two hours of connectivity a day is best served by leased lines. But this rule breaks down in the hodgepodge of ISDN rates that vary widely across the country.

"Every city is different, so there is no rule of thumb," said Jim Briggs, network service manager for Eastman Kodak Co. Eastman Kodak uses ISDN domestically and internationally, Briggs said, and costs have to be calculated separately for each location.

The ISU 512 will support the Internet Engineering Task Force's new Multilink Point-to-Point Protocol, which provides interoperability among different inverse multiplexers. Another common approach, developed by the Bandwidth-On-Demand Interoperability Group (BONDING), is better suited to video-streams, Larribeau explained.

BONDING works at the bit level and can cause propagation delays, Larribeau said, while Multilink PPP coordinates traffic on a packet basis, which better suits router links.

The ISU 512 will be introduced at the ComNet trade show in Washington, D.C., Salmon said. Pricing has not been decided, but the unit should cost about $3,000.

©Adtran: (205) 971-8000.

TyLink

Continued from page 17

onto T-1 or T-3 WAN links.

TyLink is handling ATM support by adding a separate Cell Bus to the midplane. With a total capacity of about 500M bit/sec, the Cell Bus links ATM modules to wide-area ports. Low-speed traffic from the Multiplexer Bus can be handed off to an ATM module, which then transports the traffic across the Cell Bus to a wide-area port.

Lastly, the midplane has a Management Bus, a single 64K bit/sec channel reserved for management and control of all cards on the chassis. It can be accessed locally or remotely and is SNMP-compliant.

"A product like this is like an insurance policy for corporate network users," said Kathryn Korostoff, president of Sage Network Research, Inc. in Natick, Mass. "No matter how you want to mix and match your carrier services, you don't have to worry about changing your access hardware to support them."

TyLink is wise to address ATM early on, Korostoff said, although that part of the product is still in development.

The Cell Bus is available now as an option. The plan is to support features such as T-1 ATM inverse multiplexing for multimegabit links without T-3 or fractional T-3 access costs. TyLink will also develop T-3 ATM and OC-3 ATM WAN interfaces.

All ATM modules are planned for the second half of next year, along with inverse multiplexing of ISDN.

Initial availability is set for the start of the year and will include standard data ports, T-1 WAN modules and low-speed multiplexing across the Multiplexer Bus.

A two-bus chassis will cost $1,595, while the Tri-Bus version with a Cell Bus will cost $2,595. The interface modules will cost around $3,000, and the most expensive configuration would cost close to $37,000.

©TyLink: (508) 285-0033.

A smart way to spe

INTERNETWORKING MONITOR

by Scott Bradner

Paying the piper for Internet usage

I have said before that the Internet — despite the assertions of some people — is not a free good. But for most users, it might as well be.

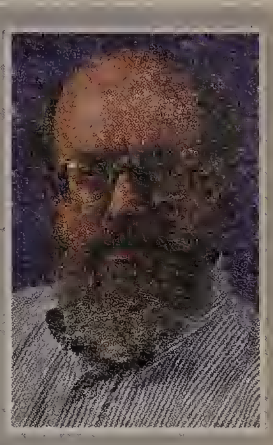
Unlike telephone usage, most Internet service has flat-rate pricing. An organization figures out what speed and type of Internet connection its usage warrants and contracts for that service.

The organization gets a regular bill, which is based on this choice but independent of the actual usage of the connection.

Most organizations then internally allocate the cost, much as they allocate the cost of electricity. The end user never sees a bill and generally remains blissfully ignorant of the actual cost to the organization. (Considering the intellectual content of some of the mail on certain mailing lists, one could end the previous sentence after the word "ignorant.")

Flat-rate pricing, while prevalent, is not universal. There are a number of Internet providers offering some type of usage-sensitive billing.

For example, the customer can receive a T-1 link and get billed a service fee quite close to the cost of a 56K bit/sec link. The customer does pay a higher cost for the T-1 phone line but gains improved performance. The reduced fee remains in place unless the customer uses more than a set amount of traffic over a certain period of time, in which case the fee is raised for that period.



Currently in the U.S., all of the major national and regional network providers offer flat-rate service. This, however, may not last.

More and more of the major telecommunications providers are getting into the Internet service business, bringing with them a long history of usage-based pricing for their telephone services.

Some of you might wonder why an organization would want to switch from a flat-rate service to a usage-sensitive one, particularly in the face of the vast expansion of World-Wide Web usage and its heavy traffic demands.

It depends on the cost model. The less expensive T-1 service described above is quite popular with some customers because it offers a usage-based fee with very few (usually two) plateaus.

There are many cases in which a properly priced usage-based service could be quite attractive to an organization because it provides inexpensive high-speed access, assuming customers can control their appetite.

SIDE EFFECTS

But there are many potential side effects of this type of pricing on the current Internet. For example, think about the providers of all that data in anonymous FTP sites. The idea of paying extra to do the world a favor might not sit all that well.

Another effect might be that organizations start to do some kind of internal usage-based billing as they do for the phone message units and long-distance charges.

The choice of funding paradigms may significantly affect the type of Internet (or National Information Infrastructure, if you will) we will be using in the future. Paradigms that inhibit the prevalence of the available Internet resources are somewhat like building a housing development in the wilderness and wondering where the birds went.

In looking at *The Boston Globe* on Thanksgiving Day, I found that there were 54.7 pages of actual content, 107.3 pages of ads and more than 300 pages of advertising inserts.

Extending this model to the Internet would please two Arizona lawyers, but otherwise it might be a good idea to keep a careful watch on which forks in the "info hypeway" we start down.

Disclaimer: Internal allocation of the costs of data networking is an ongoing issue at Harvard, but the above wanderings are my own.

➜ Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu. He shares this space with Dan Minoli, whose column will appear next week.

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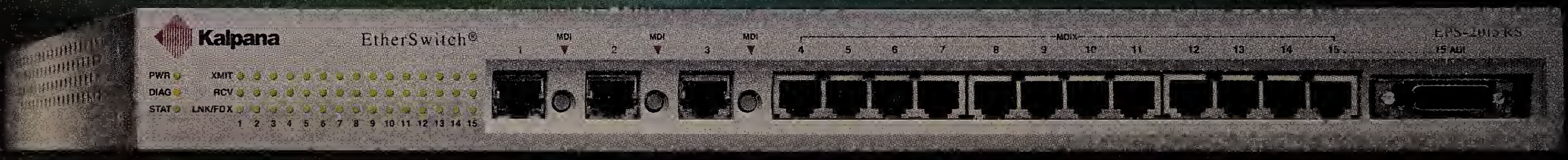
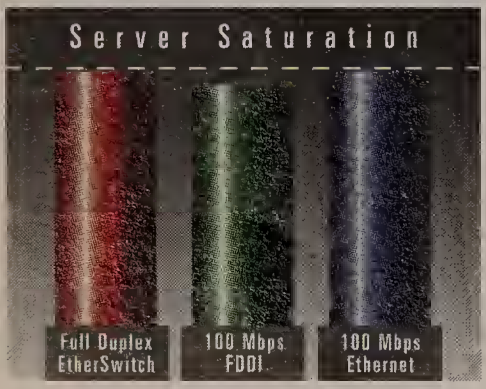


YOUR SKINNY LITTLE ETHERNETS CAN ACTUALLY OUTMUSCLE THE FAT PIPES.

Fact is, network performance is limited by what your servers can process. So you can squeeze as much or more out of them–about 20Mbps, tops–with EtherSwitches as you can with costly FDDI or 100Mbps Ethernet.



Running real applications, popular NetWare 486 servers top out at about 20Mbps, with EtherSwitch ahead of FDDI and neck-and-neck with 100Mbps Ethernet.

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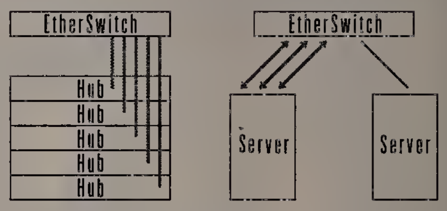

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LAN WORLD

A Special Monthly Section for LAN Decision Makers

INSIDE LAN WORLD

- **Chassis or stackable?** The hub decision is getting harder to make. See page L2.
- **Getting ready for** WinSock 2.0. See page L2.
- **Adobe's Acrobat 2.0** is turning network professionals' heads by easing document management. See page L4.
- **NLM-based fax server** from Biscom bows. See page L5.
- **Ethernet interface cards** support 10M and 100M bit/sec transmission rates. See page L12.
- **Hubbing card enhanced** to work with Novell's System Fault Tolerance (SFT) III technology. See page L12.
- **Mainframe print server** introduced for use with Microsoft's SNA Server for Windows NT. See page L13.
- **If your company lacks** an acceptable uses policy for its network, you are asking for trouble. See page L14.

BRIEFS

Extended Systems, Inc. of Boise, Idaho, announced for release in the first quarter of 1995 an external multiprotocol, multiprinter network **print server** for use on Ethernet or token-ring nets. ExtendNet MPX can accommodate up to four printers anywhere on a net. It simultaneously supports VINES, Windows NT, LAN Manager, NetWare and LAN Server environments. The print server model ESI-2810B (for Ethernet) costs $994, and the ESI-2820B (for token ring) costs $1,195.

Extended Systems: (208) 322-7575.

McAfee, Inc. of Santa Clara, Calif., has shipped Version 5.1 of its NetTools **LAN administration** software, including a version for Windows NT Server and an update to its Windows 3.0 product for Novell, Inc. NetWare networks. NetTools 5.1 adds a utility called IniTool to automate management of Windows initialization (.INI) files in network environments. Site license pricing begins at $40 per node for one to 10 workstations and drops to $27.95 per node for 1,000-user site licenses.

McAfee: (408) 988-3832.

Liebert Corp. last week introduced SiteNet Integrator, Simple Network Management Protocol-based software for controlling **uninterruptible power supplies** and environmental control systems. Compatible with the SNMP Management Information Base II definition, SiteNet Integrator can be programmed with more than 100 variables from nine diagnostic groups.

Liebert: (800) 877-9222.

Hewlett-Packard Co. today reduced the prices of its Selectable **10/100VG LAN network adapters** by as much as 34%. The new prices are $229 for Industry Standard Architecture (ISA) adapters and $349 for Extended ISA adapters. The move counters a November price cut by Intel Corp. on its fast Ethernet 100Base-T 100M bit/sec adapters. The HP adapters support standard 10M bit/sec Ethernet as well as 100VG-AnyLAN 100M bit/sec nets.

HP: (800) 533-1333.

PSI STANDARDS

Finding the dream tool for NetWare 4 managers

BY MARK GIBBS

Perhaps I should call it Gibbs' 10th law of networking: The difficulty of managing a network is at least an order of magnitude greater than its complexity. In layman's terms, the more complex the network, the harder it is to control the beast.

NetWare 4 is no exception, but a new tool from Preferred Systems, Inc. in West Haven, Conn., is certain to help network managers reduce the work load.

If you've had the chance to take an in-depth look at NetWare 4, you'll be aware of the richness and complexity of the environment. At the heart of NetWare 4 is the NetWare Directory Services (NDS).

NDS is an X.500-like naming system that acts as a single networkwide database of all servers, services and users. It not only allows single logon — the ability for users to log on once and gain access to any service they have rights for — but also a single view of all network resources and services.

If you've wrestled with configuring a NetWare 4 system, you know it is an elaborate process.

When you first build a NetWare 4 environment, you create an NDS tree that defines all of the servers, users and services in relation to each other and the network.

It is, however, a virtual certainty that you'll want to change the tree — either leaf objects (people, printers and so on) will be in the wrong container (country, organization or organizational unit), or the containers will not be in the right place.

In the former case, relocating leaf objects is pretty easy. Using the Novell-supplied NDS management utility under Windows, it is simply a matter of a drag-and-drop to move an object from one container to another.

But it is simple only as long as there are a few objects to move. If there are a few dozen, the waiting time between each object's relocation adds up to make the process another management task from hell.

Product particulars

Product: DS Standard
Function: Manipulation of the configuration of NetWare 4.X
Vendor: Preferred
Address: 250 Captain Thomas Blvd., West Haven, Conn. 06516
Telephone: (800) 222-7638
(203) 937-3000
Fax: (203) 937-3032

Users per server	Cost
10	$295
25	$495
50	$695
100	$895
250	$1,495
500	$2,495
1,000	$4,495

Consolidation license for multiple bindery servers costs $295.

It is even worse when you need to move a container to a different location in the tree. This requires that you create a new container, move each of the objects in the old container to the new container and then delete the old container.

And if there are containers in the container to be moved, you are in for a long session.

The surprising thing is that Novell apparently never planned to build tools that would solve these problems.

RALLYING TO STANDARD

Preferred first came to the market's notice with its Origen product, a NetWare 2.X/3.X application that allowed network managers to configure NetWare systems much more elegantly than the Novell utilities ever allowed.

Part of the Origen design is to allow a NetWare server's users, groups and other configuration information from the bindery to be read into a database.

The database can be modified off-line, and then the new configuration can be uploaded

See NetWare 4, *page L7*

NetFRAME launches DataJet update

Mountain and Tandberg also announce tape subsystems.

BY MARGARET DORNBUSCH

NetFRAME Systems, Inc. last week released an update to its DataJet backup software designed to provide better performing and more reliable server backups.

Separately, Mountain Network Solutions, Inc. and Tandberg Data, Inc. each unveiled quarter-inch and minicartridge backup subsystems for use on LAN servers and high-end workstations.

NetFRAME's DataJet 3.0 backup software runs on NetFRAME or other vendors' Extended Industry Standard Architecture-based servers with 10G bytes or more of disk-drive space. The software supports servers running Novell, Inc. NetWare 3.X and 4.X and storing DOS, Macintosh, OS/2 and Unix files. DataJet 3.0 works with a variety of NetFRAME tape arrays, forming a storage subsystem.

The software uses a Redundant Array of Inexpensive Disks (RAID) Level 5 configuration, which allows backup restorations even if a tape cartridge fails.

The RAID 5 configuration also can ease network operating system (NOS) migrations, said Steve Getz, director of NetFRAME's DataJet business unit. Experts recommend users do at least two full backups of everything on the server before migrating to a different or upgraded NOS, he said. DataJet 3.0 produces the two full backups automatically, cutting in half the time network managers must spend waiting for backups to complete before beginning migration.

Vinit Nangia, a senior network engineer with Data Industries, Inc. who is acting as a consultant with the New York School Construction Authority in New York, said he is pleased with DataJet's performance. Nangia manages a 700-node Ethernet network running NetWare 4.02 by using DataJet 3.0 on Compaq Computer Corp. and NetFRAME servers.

"I really like the RAID 5 idea of doing backups," he said. "If you lose a tape, you can still recover. In fact, it happened the other day. One of the tapes had some kind of error on it, but [the subsystem] did complete the entire restore."

DataJet 3.0 software for NetFRAME's DataJet three-, four- and eight-drive tape arrays is available now and costs from $14,995 to $44,995.

STORAGE STORIES

Mountain is now shipping a minicartridge tape subsystem that attaches to small networks and high-performance workstations. It stores as much as 700M bytes of data.

The FileSafe TD-700 connects to a server's floppy drive controller and transfers data from the server or workstation to the tape at up to 10M byte/min. Bundled with the tape drive is Mountain's FileSafe First for Windows backup software.

The FileSafe TD-700 costs $399; FileSafe First is available separately for $79.

See NetFRAME, *page L9*

Reality ✓ Check

Product: DataJet 3.0
Company: NetFRAME

The benefits:
- RAID 5 support for fault tolerance.
- Vertical queuing keeps data moving along.
- Regulates cache uses for queuing.
- Burst protocol speeds data delivery.

The drawback:
- No file-by-file backup.

The user view:
"DataJet is very intuitive. It does about 6G bytes an hour on a four-tape setup, and even file-by-file restores are pretty quick. I would like to see some file-by-file backups, if possible, but that would probably slow it down."

Vinit Nangia

HUB MARKET

Why not stackables?

BY JOANNE CUMMINGS

You wouldn't buy a fancy sports car to cart the kids to soccer practice. Nor would you expect a station wagon to compete effectively in the Grand Prix.

The choices used to be as clear when it came to making decisions about wiring hubs – whether to go with a fancy chassis or economical stackable.

Chassis, although more expensive, offered the latest features and were engineered for the highest reliability, including redundant power supplies and the ability to swap modules on the fly. Stackables, on the other hand, offered only the most basic features but at an attractive price.

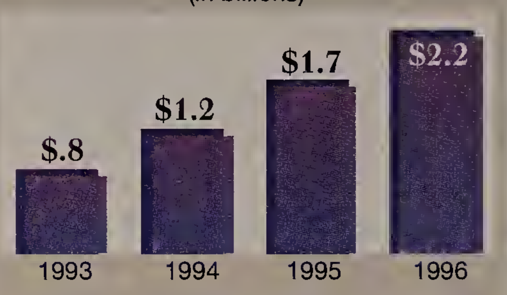
Now the lines are blurring. Users taking a fresh look at the hub market find that stackables are approaching chassis in reliability and offer some compelling features while still maintaining their considerable cost advantage.

And with the evolution of network architectures, users are finding they don't really need all the high-level features of a chassis in every wiring closet. Instead, when it comes time to add ports to a maxed-out chassis, many are turning to stackables as an affordable way to gain the few extra ports they need, instead of adding yet another chassis.

"We no longer just automatically purchase chassis-style products from firms like Cabletron or SynOptics," said Kevin Walsh, network specialist at the University of California, San Diego. "Stackables are a lot less money. I mean a lot less money. And you get the same functionality."

Stackable market to skyrocket

Estimated growth in Ethernet hubs (in billions)



Figures are based on statistics compiled from IDC and Dataquest.

SOURCE: BAY NETWORKS, SANTA CLARA, CALIF.

The school had previously purchased only Multi Media Access Center (MMAC) chassis-based hubs from Cabletron Systems, Inc., he said. "We used to buy the Cabletron stuff almost automatically," Walsh explained. "But then I looked at the seats I needed to serve and compared what it would cost to use MMACs vs. stackables from Hewlett-Packard Co. And if I bought from Cabletron, I would have spent almost $40,000 more for the same seat count."

The difference is often simply a matter of volume. Since expansion is typically incremental, the number of new users will rarely be high enough to fill up another chassis and bring the cost per port down to the level of a stackable.

"In general, your cost to provide bandwidth out to the wiring closet is probably less with a stackable," says Gary Thomas, manager of enterprise market development at Bay Networks, Inc., the company formed by the merger of Wellfleet Communications, Inc. and SynOptics Communications, Inc.

"On a chassis hub like our 5000, you would have to have a lot of users on a floor to make it worthwhile," Thomas said. "We support 300 users on the 5000, but usually a floor is going to have under 100 users. The stackables tend to be more economical at that break point." Chassis-based hubs only beat the price of stackables if you fill them up, he added.

Besides cost, the features typically required at the wiring closet today do not call for high-end chassis-type hubs.

"The architectures of networks are changing significantly," Thomas said. "About 70% of the companies we see have adopted the collapsed backbone architectures, where they centralize their routing functions."

With routers centralized in a data center, there is less call to integrate routers in hubs out at the edges of the network. Stackables, then, make even more sense, he added.

The market bears that out, as well (see graphic). But there are some users who are still unwilling to look to stackables.

"They don't know what they could be saving; they haven't compared," Walsh said. "Plus, they get used to buying one thing and they don't want to change."

For many companies, the hub choice becomes almost a religious issue, according to Thomas. "When we asked people why they preferred one or the other, we got a lot of strange answers," he said. "The conclusion is it's just not too quantifiable."

Others agree. "People choose a chassis or they choose a stackable, and they tend to go on buying more of whatever they chose the first time around, no matter what," said Carol Rahn, product-line manager for 3Com Corp.'s chassis hubs.

CATCHING UP

In addition to cost, stackables often make more sense now due to the fact that the features offered and the reliability are more on par with chassis than they were in the past.

"We're seeing large Fortune 500 customers moving to stackables because they have more confidence in them now," Thomas said. "Because they're simpler, they're reliable and easier to manage."

Walsh added, "We went with stackables not just for the price, but also for their reliability. I've had zero failures with more than 60 HP stackable units in service for more than two years. But I've had a couple of Cabletron chassis fail on me."

Sometimes the chassis' fault tolerance is not all it's cracked up to be, according to Walsh. "One chassis that failed supposedly had redundant power supplies," he said. "One of them failed, and it shorted out the power supply bus, which basically killed the whole unit. Not very redundant."

Reliability is key. "When you have as many units as we have in service 24 hours a day, you need zero failures," he said. "I don't have time to doctor this stuff, and with the stackables, I don't need to."

MANAGEMENT

Management is another factor. "It's cheaper to put a stackable on top of a maxed-out chassis, but then management is the challenge," said Michael Howard, president of Infonetics Research, Inc., a San Jose, Calif., consultancy. "You'd have to make sure the stackable was manageable, preferably with some kind of [Simple Network Management Protocol] management."

Users agree. "If you have an SNMP manageable unit, then stackables work just fine," Walsh explained. "And we get ours from HP, and they're pretty much the market leader when it comes to providing SNMP management."

Another way to ease management is to buy the stackable from the same vendor as your chassis. "You need to buy from the same vendor that you bought your chassis from so that you have consistent network management," 3Com's Rahn said. "Otherwise, you may end up juggling management tools."

The place where chassis shine, however, is in the network center.

"There's a clear set of mission-critical features —

See **Stackables**, *page L9*

Windows Connectivity Forum

WinSock 2.0 —the next generation

By Joel Diamond
Technical director
WUGNET
Windows User Group Network
76702.1023@CompuServe.com

The Windows Sockets API 1.1, one of the few independent technical application program interface standards created in recent years, was developed to provide a sockets-style transport interface for TCP/IP connectivity.

The WinSock API was created out of the need for a binary-compatible interface to multivendor TCP/IP stacks under Windows. Since its original release three years ago, hundreds of tools and products based on the well-documented and distributed API have been released from the commercial and public domain communities. (WUGNET's last survey indicates that more than 250 compatible applications have been released, announced and shipped in 1994 alone).

Despite all this, WinSock 1.1 was developed at a time when Windows was a 16-bit operating system, not for Windows NT or Windows for WorkGroups.

But Microsoft Corp. and the original WinSock 1.1 specification committee have established a new committee to facilitate the next generation of network-aware applications and support new technologies such as IPng. I encourage *Network World* readers to participate on this WinSock 2.0 committee, which is open to all developers, transport providers and end users.

The Windows Sockets 2.0 mission, as pulled off of Microsoft's World-Wide Web server, reads: "The Windows Sockets 2.0 effort is chartered to design a ubiquitous transport-level API for the Microsoft Windows family of systems products. The API will be designed to facilitate transparent access to multiple transport families and permit third-party transport vendors to work into the scheme."

The WinSock 2.0 committee had established a goal of completing the specification by this past April 30, but not surprisingly, the volunteer organization has fallen behind. Microsoft's recent decision to incorporate a full 32-bit WinSock 1.1 stack for Serial Line Internet Protocol (SLIP) and Point-to-Point Protocol connectivity in the final shipping version of Windows 95, planned for June 1995, has not made the group's job any easier.

Originally, the WinSock 2.0 committee identified basic rules for the API, including:

- Backward-compatibility with Windows Sockets 1.1.
- Limiting changes to the Windows Sockets 1.1 specification to clarifications only.
- New functionality that will be clearly distinguishable from the 1.1 API.
- Optional functionality that should be generally useful and the exception rather than the rule.

With these rules agreed upon, the committee's next agenda was to establish goals and tasks in three areas:

- **API extensions —** The primary focus will be in adding useful functionality proposed by applications vendors. Examples include improved support for non-C languages (BASIC, Pascal and C++), and transaction-oriented protocol support.
- **Multitransport capabilities —** The primary issue is that applications must be aware of the addressing format of the transports below them.
- **Operating system considerations and architecture —** It will be desirable for an application to use multiple transports provided by different vendors on the same system without conflict.

WINSOCK ORGANIZATION

The WinSock 2.0 committee has organized the specification process into several groups, each assigned to specific issues, including generic API extensions, WinSock 1.1 specification clarifications, name resolution (directory services development), coexistence of different vendor implementations, telephony extensions, wireless extensions and others.

In next week's column, I will fill you in on the status of WinSock 2.0. Look for additional resources posted in WINCON Library 10, the WinSock Library.

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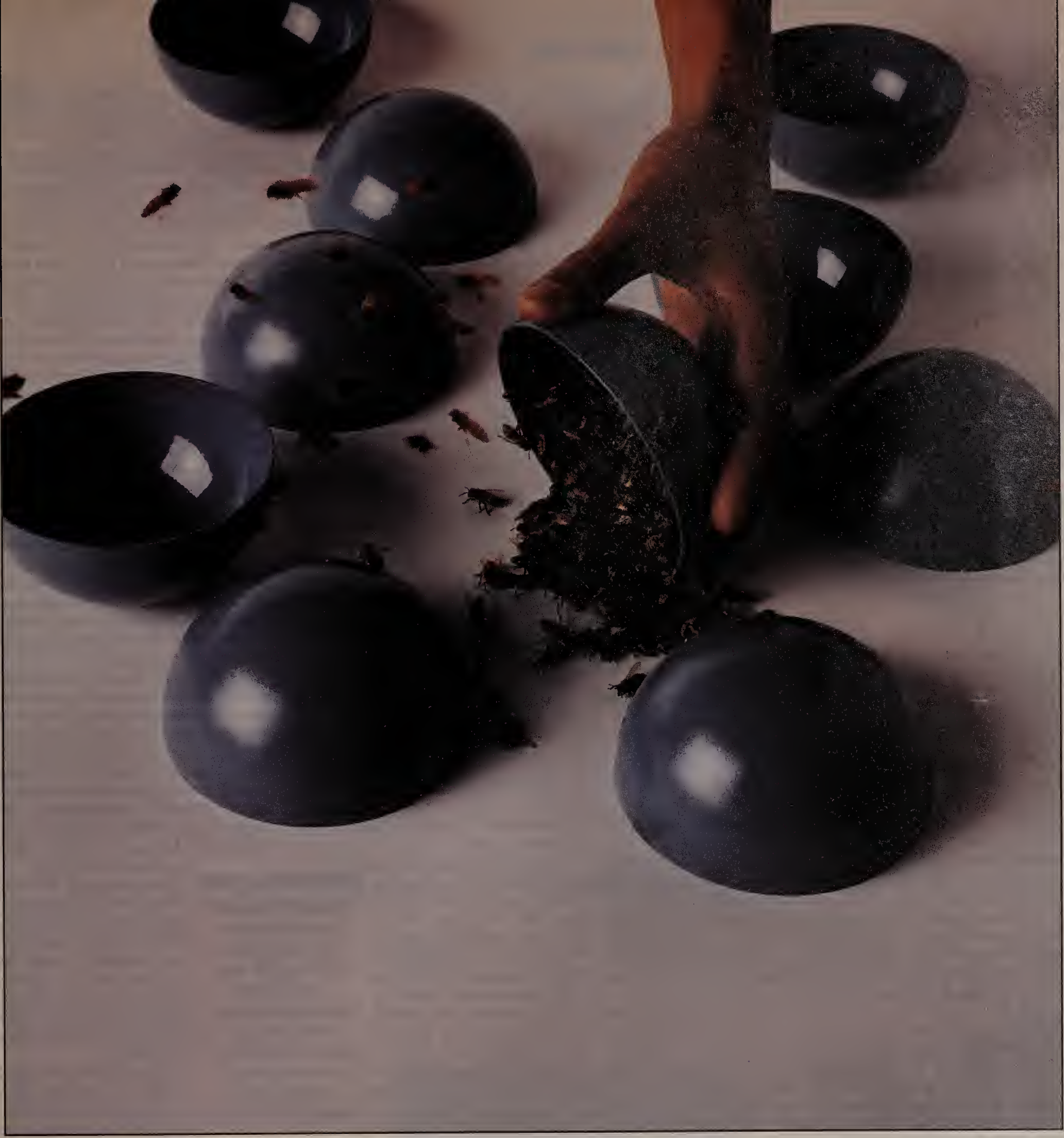
To participate on the Windows Connectivity Forum, type **Go Wincon** at any **!** prompt on CompuServe. For those of you who are not CompuServe subscribers, *Network World* and the Windows Users Group Network are offering a free membership sign-up by calling (800) 524-3388. Ask for Operator 426.



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Acrobat 2.0 winning net converts

Adobe's latest version brings cross-platform documents to networked workgroups.

BY BILL WOODCOCK

The new version of Adobe Systems, Inc.'s Acrobat document exchange software is turning the heads of network professionals with enhancements designed to ease document manipulation in multivendor workgroups.

The Acrobat 2.0 family adds a number of features to last year's initial release: full-text searching across multiple documents, hypertext-like hot linking within and between documents, and easier navigation using thumbnail views and a reader that can follow article threads from page to page.

Acrobat is a system of software tools for creating, viewing and manipulating Portable Document Format (PDF) files. PDF is a superset of Adobe's PostScript page description language and shares many of the same strengths while adding support for hypertext links and many enhancements intended to let users view and manipulate files on-screen, even if they don't have the applications used to create the files.

These features help differentiate Acrobat from PostScript, which is intended solely for document interpretation by printers. It is, in effect, an evolution of PostScript: Where PostScript was a tool for generating more paper documents, PDF is a means of eliminating the need for paper documents.

Acrobat 2.0 is available in three packages: the baseline Acrobat 2.0; Acrobat Pro 2.0, which adds a conversion utility; and the top-of-the-line Acrobat for Workgroups 2.0, which adds a cataloging and indexing server.

The base package, Adobe Acrobat 2.0, as well as the higher end packages, contains three components: Acrobat Reader, which is a freely distributed viewer for client workstations; Acrobat Exchange, which integrates a more feature-rich reader and searching capabilities with authoring functionality; and PDF Writer, a local printer simulator that allows you to print PDF files from any program.

A fourth component, Acrobat Search, is an optional powerful search engine for Exchange. The engine was licensed from Verity, and its integration with the Exchange reading and authoring environment seems less than complete; rather than replacing the simple single-document search capability of the Reader, it's added in, almost as an afterthought, appearing only in the toolbar and not in menu commands or command-key equivalents.

Although Exchange and Reader are capable of exporting RTF-formatted text to the clipboard, in practice, this is troublesome because it is not always possible to select the text to be copied. PDF Writer is simple and straightforward, performing exactly as expected.

The Acrobat package lists for $195 and is expected to have a street price of about $150. It requires 5.5M bytes of disk space and 2M bytes of random-access memory.

FREE READERS

Adobe apparently learned a tough lesson with Version 1.0 — trying to sell Acrobat readers, the run-time applications capable only of viewing documents, not creating them. It has wisely decided to make the 2.0 reader freely and widely available to encourage the use of the PDF format, thus indirectly promoting the sale of its authoring tools, as well.

The reader is available on-line from a variety of sources (see graphic) for Macintosh, Windows and SunOS/Solaris environments.

Acrobat Reader has a variety of paging and viewing features, including fit-to-window and arbitrary percentage magnification, as well as a potentially useful slide-show mode, which uses the full screen and can hide the cursor.

A plethora of readers

Acrobat 2.0 readers are free for Macintosh, Windows and SunOS/Solaris from these sources:

- On the Internet at:
  http://www.adobe.com/Software.html
  ftp://ftp.adobe.com/pub/adobe/Applications/Acrobat
- CompuServe and America Online
- Adobe's One BBS at (408) 562-6839
- Macintosh and Windows versions are available on disk for $9.95, and all four versions, along with the complete works of Shakespeare, a dictionary and a variety of U.S. historical documents, are available on one CD for $14.95.

Acrobat Reader has a simple text-searching command that operates within the current document. The reader takes up about 1.5M bytes on disk and requires 2M bytes of RAM to run.

THE HIGHER END

Next up the ladder is Acrobat Pro 2.0, which includes the components of the basic package and Acrobat Distiller, a utility for performing batch conversion of PostScript files to PDF format.

Distiller is effective, but its interface seemed perhaps too sparse in Version 1.0, and nothing has been done to alleviate user interface insufficiencies since the original release. For instance, although this is a batch-processing program, messages and errors are erased from the console after each file is processed, and they are not recorded in the log file.

This annoyance was minor, however, since it did not produce any errors or fail to properly convert a PostScript file to PDF during our review period. Acrobat Pro 2.0 has a list price of $595. In addition to the 5.5M bytes of disk space occupied by the basic utilities, Distiller takes an additional 7M bytes and requires 6M to 8M bytes of RAM.

The top-of-the-line package, Acrobat for Workgroups 2.0, includes a 10-user license for Exchange, a copy of Distiller, and Acrobat Catalog, a Windows-only application that creates compact indices of the contents of PDF files on the network, vastly accelerating word searches from within the Acrobat Search portion of Exchange. Pricing for Acrobat for Workgroups is set at $1,595. Each of the packages includes Macintosh and Windows software, and all the Macintosh software runs in native mode on PowerPC-based computers. The SunOS/Solaris versions of the Acrobat products are still in 1.0 release, but 2.0 versions are expected in the second quarter of 1995.

The only other publicly available application that currently reads and writes native PDF documents is Adobe's Illustrator drawing package (also available on Macintosh, Windows, SunOS/Solaris and Irix).

This is likely to change soon, as Altsys, maker of FreeHand, the longtime rival of Adobe Illustrator, has announced that it will be supporting PDF. Apparently The Associated Press, the largest user of FreeHand, demanded compatibility with Illustrator, and PDF support proved the best means.

One of Acrobat 2.0's most useful features, and the area in which it is most open to third-party extensibility, is its hypertext links.

Links are simply navigational aids within or associated with Acrobat documents. They come in a variety of styles and can perform several functions. The most common sort of link switches the user's view to a different position, whether somewhere else on the same page, on a different page within the same document or within a different document altogether.

Viewing preferences, such as magnification, are also associated with links, so a page could, for instance, include links to itself at different magnifications to facilitate easier viewing under different conditions. Links can appear either in the form of buttons on pages of a document, whether with visual properties of their own or transparent, or they can appear as text labels called "bookmarks" in a list external to the document.

URL LINKING

Links can also potentially call outside code modules, applications or scripts, and this is of great interest to many in the networking community. During the Seybold Desktop Publishing Exposition at San Francisco in September, Adobe demonstrated Acrobat 2.0 interoperating bidirectionally with an unmodified copy of the NCSA's Mosaic HyperText Transfer Protocol client software.

The plug-in Acrobat module, which enables Uniform Resource Locator linking, is not included with the 2.0 release but is expected to ship for free by March 1995. It enables links to standard-format Uniform Resource Locator (URL), which are then opened by and displayed within an external application, such as Spyglass, Inc.'s Enhanced NCSA Mosaic.

Conversely, Acrobat Reader and Exchange are already tailored to act as helper applications for Mosaic, so several sites on the Internet have already begun using PDF files as a means of distributing materials.

Acrobat Reader and Exchange are already tailored to act as helper applications for Mosaic, so several sites on the Internet have begun using PDF files.

The PDF file format gives them more formatting flexibility than HTTP's native HyperText Markup Language, and Acrobat's specialized document creation tools present a less labor-intensive alternative to hand-converting existing documents to the HTML format.

USER EXPERIENCES

A number of Adobe's customers and beta-test sites have put Acrobat's linking and helper application capabilities to use. One major site, which is publicly accessible over the Internet, is the University of Pennsylvania's Wharton School of Business.

With the introduction of Acrobat 1.0 in June 1993, IS Manager Kendall Whitehouse saw an opportunity to simplify the sharing of in-house documents between Macintosh and Windows microcomputers in the business school's four computer labs.

PDF documents residing on a pair of 486 Novell, Inc. NetWare servers were soon being shared by users of both client platforms. Whitehouse found unexpected benefit in a lessening of the time required to update informational files since the switch to centrally served PDF documents had reduced his work load to updating just one authoritative copy of each document.

After receiving Acrobat 2.0, Whitehouse went a step further and began using Wharton's Unix workstation-based HTTP server to make the PDF versions of his school's publications and documents accessible across the 'Net.

Version 2.0 also solved Wharton's document management problems. Prior to the integration of multiple document and index file searching, Whitehouse had been forced to implement an external Windows Toolbook-based hierarchical index system to aid users in finding the information they needed. Now users simply search for the keywords they're interested in and choose from the list of matching documents.

INTEGRATING ACROBAT

Equitable Life Assurance Society of the U.S. has used Adobe's forthcoming Software Developers Toolkit, which documents Acrobat's some 500 application program interfaces, to integrate the Acrobat document authoring tools and readers into its existing in-house document distribution system.

The proprietary software runs on a distributed net of OS/2 servers and is now serving about 700 of an anticipated 8,200 insurance sales agents using Windows desktop and notebook computers. The software developers' kit, expected to cost less than $500, and standard-defining *Portable Document Format Reference Manual* ($24.95, Addison-Wesley, 1993) should both be available soon from the Adobe Developers' Association, which can be reached at (415) 961-4111.

This past spring, the Internal Revenue Service used Acrobat to create PDF versions of nearly 500 different tax forms and instruction pamphlets, which were made available on CompuServe, and more recently, President Clinton used the PDF file format to distribute the 1995 U.S. budget on CD-ROM.

Although PDF is still a single-vendor file format, Adobe's active promotion of PDF as a cross-platform standard seems likely to induce other vendors to adopt it, as well, just as they adopted PostScript nearly 10 years ago. If that happens, PDF could well become the standard of choice for platform-independent storage of formatted data. Its promise is not just that your data will be accessible on different vendors' computers, but that there will be readers capable of interpreting it on new platforms that will come out over the course of the next decade.

This should free IS managers from worry that documents will become inaccessible after the inevitable extinction of whatever computer system they were created on.

Whatever temporary shortcomings users may find in the Acrobat suite of applications, the underlying file format, upon which the whole system depends, certainly seems sound enough to justify the relatively small investment required to begin adopting it as a standard for document storage and distribution.

➾ Woodcock is president of Zocalo Engineering, an AppleTalk and IP net consulting firm based in Berkeley, Calif.

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2. Purchase timeframe

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5 ☐ Within six months
6 ☐ Within one year

12/12/94

3. Scope of purchase responsibility

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4. Purchase influence/ number of sites

9 ☐ one site
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11 ☐ 10-20 sites
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Biscom offers NLM-based fax server for NetWare 3, 4

BY JOANNE CUMMINGS

Chelmsford, Mass.

Biscom, Inc., based here, has introduced a NetWare Loadable Module (NLM)-based fax server for NetWare 3.X and 4.X environments.

Because Faxcom for NetWare runs as an NLM, it is more tightly integrated with NetWare and can be more easily managed than a stand-alone facsimile server, according to the company. Faxcom for NetWare can also support a variety of NetWare clients, including those based on DOS, Windows, Macintosh and Motif, enabling administrators to centrally manage all LAN-based fax traffic.

The integration software allows faxes to be sent, received or monitored using the E-mail programs.

The basic product consists of server-resident NLM software, DOS client software and a LAN-attached Faxcom fax server. Additional client software for Windows, Macintosh and Motif-based X Window System clients can be purchased as options.

According to Biscom, the NLM does not tie up server resources because it off-loads CPU-intensive functions, such as converting PostScript files into fax images, to the Faxcom fax server. Functions that run on the file server, such as client/server messaging, queue control, administration and integration with the bindery, include only those that maximize NetWare integration.

The product provides centralized fax control, administration and queue management for all clients supported, enabling administrators to monitor and manage fax traffic on the network, regardless of client mix.

Biscom provides optional software for integrating the fax product with certain Message Handling Service (MHS)-compatible electronic mail packages, such as Microsoft Corp.'s Microsoft Mail and Lotus Development Corp.'s cc:Mail.

The integration software allows faxes to be sent, received or monitored using the E-mail programs. Customers not wishing to use E-mail can use the product's Faxcom Manager software to watch the status of faxes as they are queued and transmitted.

When faxes are received, they can either be printed or, if used in conjunction with direct-inward dial services, routed to specific users. When faxes are routed, users are automatically notified on-screen, and their "received fax" log is updated. Received faxes can be viewed at a user's workstation, printed, stored as a TIFF or PCX file, forwarded to another LAN-attached user or refaxed to another destination.

The Faxcom for NetWare Windows client also supports optical character recognition (OCR) technology as an option. With OCR, users can convert a fax image to editable text,

See Biscom, *page L13*

Pack helps keep SNMP mgrs. in sync

Bridgeway Corp. recently unveiled software that helps synchronize object database and network topology mapping functions across different Simple Network Management Protocol-based network managers.

With the software, called MapSync 1.0, users can let leading SNMP-based management platforms, such as Hewlett-Packard Co.'s OpenView, IBM's NetView/6000, and SunSoft, Inc.'s SunNet Manager and Encompass, share functionality in a distributed computing environment, the Andover, Mass.-based firm said.

MapSync uses SNMP to speak to the four management platforms and perform key updating and management tasks, including reading the SNMP manager's object database and topology maps, as well as updating both the object database and topology maps, plus generating an audit trail on all operations performed.

The software lets users maintain multiple SNMP-compliant managers by periodically updating them and keeping them synchronized. This lets them share functionality and even act as backup systems in the event of a failure, according to the company.

MapSync 1.0 is available now.

The software costs $3,000 for two platforms and $1,750 for each additional management platform.

©Bridgeway: (508) 683-3626.

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Circle Reader Service #4

NetWare 4

Continued from page L1

to the server.

Seeing an opportunity to develop a similar product to address the configuration difficulties of NetWare 4, Preferred established a strategic relationship with Novell and released DS Standard Version 1.0 in November.

DS Standard is a Windows-based NetWare 4.X configuration tool that wisely borrows from the user interface of Novell's own NWADMIN utility. For example, DS Standard uses the same icons as Novell for containers and leaf objects, the same hierarchical tree display and almost identical dialog boxes for object properties.

But that is where the similarities end. DS Standard addresses the problems of managing NetWare 4.X configuration with a degree of sophistication that is impressive.

OFF WITH THE OLD

DS Standard, like its stablemate, Origen, employs on-line NetWare configuration capture, off-line editing and on-line reconfiguration.

Before a server's data can be captured — "discovered" in DS Standard parlance — you must be logged on to that server. To start a discovery process, you open a new "view." You can also open an empty view with only a root object if you want to start a tree from scratch.

The discover process can be run for multiple bindery-based servers to build a view that combines all of the configuration data. The bindery data is imported as objects under an organizational unit named after each server.

Rating
DS Standard

Based on a highest score of five.

Documentation	✓✓✓
User interface	✓✓✓
Performance	✓✓✓✓
Usefulness	✓✓✓✓✓
Value for the money	✓✓✓✓✓
Overall score	**✓✓✓✓**

The basic license for DS Standard only allows for the discovery of a single bindery-based server, but a "consolidation" license is available that allows for the inclusion of multiple bindery-based servers.

DS Standard is also useful when you are upgrading NetWare 3.X servers because it can also capture data from bindery-based NetWare servers (that is, NetWare 2.X and NetWare 3.X systems).

MODELS AND PROJECTS

Once configuration data from existing servers has been captured by DS Standard, the network manager can start making changes.

Because the captured NDS data is saved and manipulated in a custom database, rather than changes being applied directly to NDS itself, editing is fast and painless in compared to making changes through NWADMIN or NETADMIN (the DOS version of NWADMIN).

Because the password system under NetWare 4.X is very different from that of NetWare 3.X, passwords will need to be redefined as part of the upgrade process.

One or more views can be saved as a group called a project. This feature allows a network manager to save multiple models of a target configuration.

The details of a view can be reported through a print option that will output the current view to a printer exactly as it appears in the window — as a hierarchical tree structure. If the view is filtered to display only containers, leaf objects or a range of leaf objects, then that is the scope of the output.

Once a new NDS configuration (a view) is completed, the changes can be applied to the real NDS system. Since these changes are carried out without operator involvement, the process can be started when system utilization is low.

A side benefit is that copies of a network's NDS database made by DS Standard can be used as backups. In the case of minor NDS database corruptions, using DS Standard to reconstruct the system will usually be much faster than restoring from a regular backup system.

THE ASSISTANT

Another area where DS Standard stands out is in its Assistant feature. The Assistant is really a Windows Help file, but it contains a lot of useful information about the whys, hows and whats of setting up a NetWare 4 system.

In particular, the Assistant includes checklists and forms that will aid in the planning of an NDS installation. It includes, for example, case studies of Novell's internal network and The Chase Manhattan Bank, N.A.'s systems.

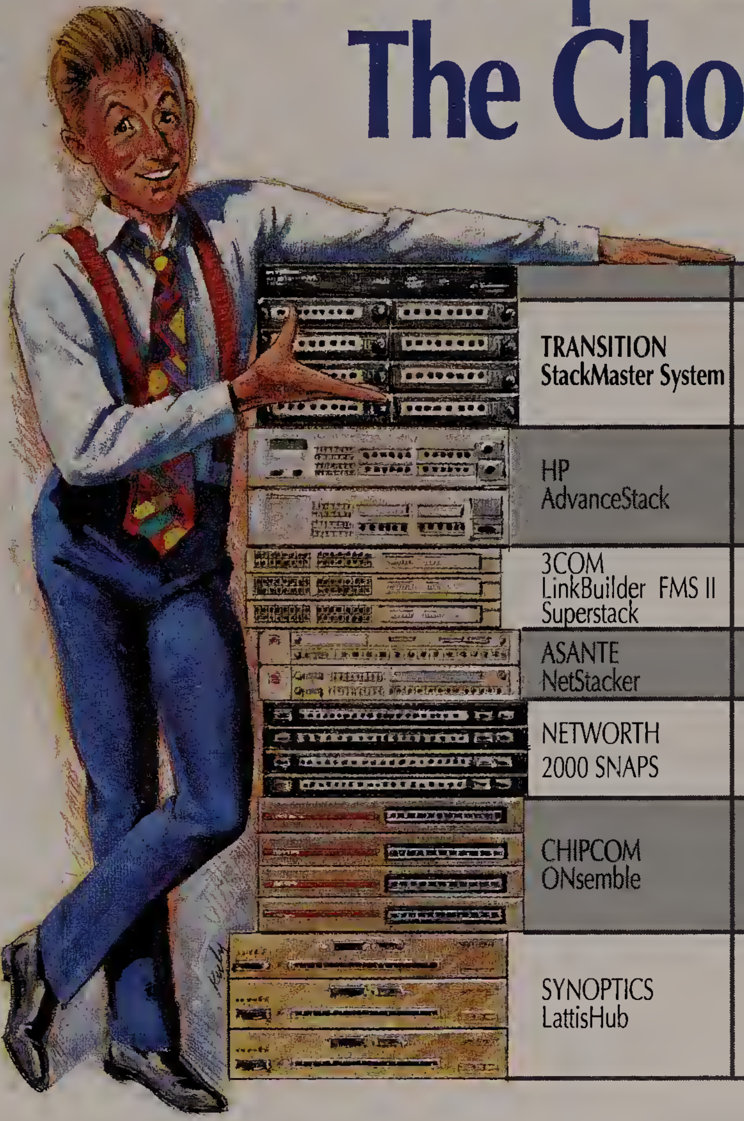
There are many useful details and explanations embedded in the Assistant. There are also some gaps. For example, the manual refers to a section in the Assistant that discusses how to estimate the time required to execute a reconfiguration, but I was unable to find a section on the topic.

The DS Standard manual explains how to do a variety of operations that are impossible or, at the least, difficult without DS Standard.

Merging two trees is a function that Novell will not support until the release of NetWare 4.1 but is easily performed by DS Standard 1.0.

See **NetWare 4**, *page L9*

Given How
The Competition Stacks Up,
The Choice Is Clear.



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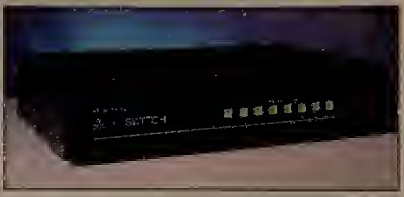

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NetWare 4

Continued from page L7

You can also consolidate multiple servers. DS Standard prompts you for rules on how to handle multiple objects from different servers that have the same name. The options range from overwriting the resulting merged object attributes with the last object's properties.

Prune and graft – the operation of moving a section of an NDS tree from one location to another – is easily handled by DS Standard, as is the option to rename a tree. This latter operation isn't available with any Novell utility, and while Preferred doesn't recommend it, renaming a tree can be easily done.

DS Standard addresses many of the configuration problems about which early adopters of NetWare 4.X have complained.

DS Standard displays many of the minor problems associated with a 1.0 release. Indeed, in our early testing, we encountered peculiar transient problems and error messages that asked us to delete files and then crashed the product. That said, we didn't lose any data, and the problem seemed to subsequently correct itself. Other irritations included the impoverished printing facilities and weak reporting services.

More importantly, DS Standard addresses many of the configuration problems about which early adopters of NetWare 4.X have complained.

Our overall impression is that DS Standard is a product we cannot live without. The NetWare 4.X regime is complex, and any tool that makes the slightest dent in the management task is more than welcome.

A product like DS Standard promises to make NDS modifications orders of magnitude easier than before. If Novell was smart, it would bundle it with NetWare 4.

If you are a NetWare 4.X manager, this is a standard you'll want to fly. Managing NetWare 4 without DS Standard is just too hard.

➻Gibbs is a consultant and writer based in Ventura, Calif. He can be reached at (800) 622-1108, Ext. 504, or on the Internet at mgibbs@rain.org.

Stackables

Continued from page L2

everything from power redundancy to configuration redundancy – that you need in the network center, and the chassis still delivers those better than a stackable," explained Bay's Thomas. "And even though the chassis are priced at a premium, your ability to amortize those costs among all the users on your network is much greater in the network center."

Rahn agreed. "Most customers still feel more confident about a chassis, particularly at their headquarters, because of the reliability it offers, because of how easily it handles moves and changes, and because of the segmentation they can get in a chassis-type hub," she said. "But customers who really rate reliability and want to make the most efficient and tidiest use of wiring closet space are still going to want a chassis over a stackable."

Still, there doesn't seem to be any overriding reason not to explore stackables, according to users and vendors. Basically, the choice comes down to the number of users you need to support and the number of units you need.

"There are usually so many wiring closets in a building that cost-per-unit becomes a big deal," Thomas said. "But as long as you can get a good product for the right cost and you know it's manageable and doesn't limit your growth in the closet, you're fine. Then, adding a stackable may make more sense than adding another modular hub."

➻Cummings is a free-lance writer in Marlborough, Mass.

NetFRAME

Continued from page L1

Tandberg introduced its first minicartridge tape subsystem as well as a higher capacity quarter-inch cartridge (QIC) subsystem.

The Panther Mini 1000 minicartridge subsystem attaches to the server or workstation via a Small Computer System Interface (SCSI)-2 connection. The unit stores up to 1G byte of data in its native format and transfers data from the server or workstation at up to 18M byte/min. The Panther Mini 1000 comes bundled with DOS, NetWare or Windows backup software.

Tandberg's Panther 5000 QIC backup subsystem stores up to 5G bytes of data. Data transfers from the server to the subsystem can reach rates of up to 36M byte/min. The system can be bundled with NetWare, Unix or Windows NT software. The Panther Mini 1000 starts at $799; the Panther 5000 starts at $1,695 for an internal, single unit.

NetFRAME: (408) 944-0600; Mountain: (408) 438-6650; Tandberg: (800) 826-3237.

➻Senior Editor Peggy Watt contributed to this article.

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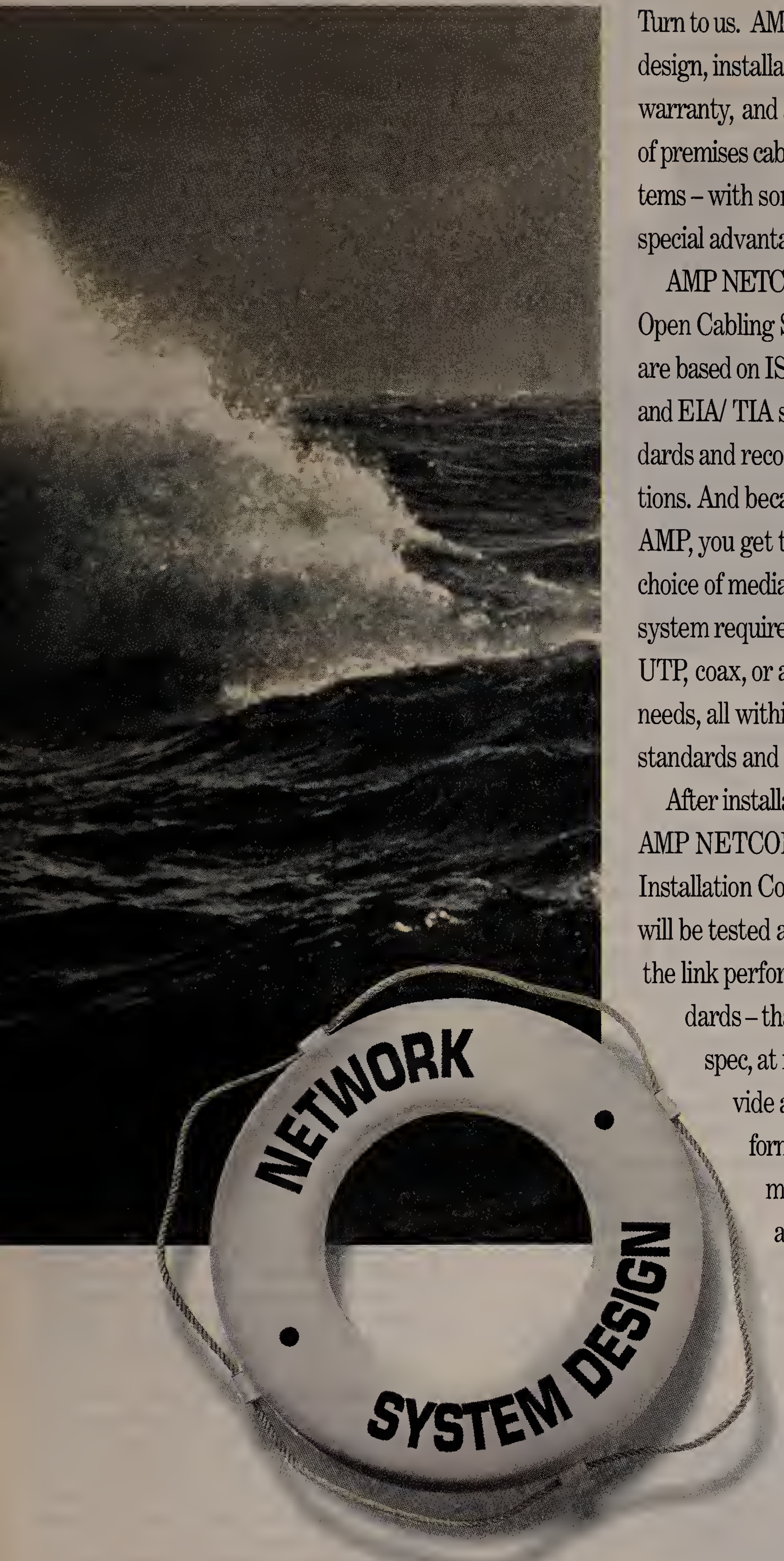

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AMP

Circle Reader Service #3

XNET beefs up its switching hub card to support SFT III

BY JOANNE CUMMINGS

XNET Technology has enhanced its Series 1800 ParallelSwitch hub card to support Novell, Inc.'s System Fault Tolerance (SFT) III technology.

The ParallelGuard feature enables users to install a second switch card in a backup NetWare server and maintain switching functionality even when the primary server fails, according to XNET, based in Milpitas, Calif.

The Series 1800 is a six-port switching hub card that resides in a NetWare file server and is used to link the server to as many as six 10Base-T Ethernet segments. Because it switches among the segments, it offers a total of 60M bit/sec of bandwidth to the server, the firm said.

Under SFT III, when the primary NetWare server fails, all functions are immediately picked up by the backup server, which had been mirroring the primary server's processes.

ParallelGuard works in much the same way. When it senses the primary server failing, it automatically channels the switching function to the card in the second server, ensuring continuous operation. This changeover occurs within 5 seconds of the primary server's failure, according to the company.

In SFT III environments, both Series 1800s are active but only one conducts the switching function. The cards continually monitor packet output from the servers and, based on their traffic, determine if they are operating in primary or secondary mode. Only the card in the primary server is allowed to function.

IN CASE OF A FAILURE...

If the primary server fails, the local card determines that it is no longer serving the primary role and ceases switching, then the secondary server kicks in. Without the ParallelGuard feature, the firm said, both cards would continuously switch, creating endless loops within the network.

ParallelGuard also guarantees operation if one of the Series 1800s fails. During typical operation in SFT III mode, the cards communicate with one another by sending "I'm Alive" packets from the primary to the secondary server. If the primary server card fails, the secondary server card will detect the loss of communication and pick up the switching tasks.

ParallelGuard is available as an upgrade to all current Series 1800 ParallelSwitch customers at no cost. The Series 1800 is priced from $1,988 to $3,288, depending on the server bus type (Industry Standard Architecture or Extended ISA) and media connection (unshielded twisted pair or BNC).

©XNET: (408) 263-6888.

Comments?

See "How to reach us" on the back page.

Ethernet NICs provide easy migration path

Compex, Inc. has unveiled a series of Ethernet network interface cards (NIC) that can support both 10M and 100M bit/sec transmission rates.

Based on Hewlett-Packard Co.'s 100VG-AnyLAN technology, the ENET100-VG4 series of NICs are designed to provide an easy migration path to 100M bit/sec Ethernet speeds, the company said.

Each card comes with two RJ-45 connectors, one for 10M bit/sec operation and one for 100M bit/sec. They also have one BNC connector for 10M bit/sec operation. As long as the network is equipped with an IEEE 802.12 100VG-AnyLAN-compatible hub, changing from 10M to 100M bit/sec operating mode is as easy as changing the cable from one RJ-45 connector to the other and rebooting the computer, the firm said.

Compex, based in Anaheim, Calif., provides driver support for all popular network operating systems, including Novell, Inc.'s NetWare, Microsoft Corp.'s Windows NT and LAN Manager, Artisoft, Inc.'s LANtastic, IBM's LAN Server and Digital Equipment Corp.'s PathWorks.

The NICs are available for both Industry Standard Architecture (ISA) and Extended ISA (EISA) buses. The ISA version supports a 64K-byte buffer, and the EISA card supports a 128K-byte buffer.

The NICs cost $399 each. A six-port VG100 hub is also available for $1,399.

©Compex: (714) 630-7302.

Their Readers.

Our Readers.

Network World readers — **Network IS professionals** — are no small change. On the contrary, IntelliQuest's Computer Industry Media Study (CIMS) V1.0 proves what we've been saying right along — on average our readers plan to spend more in total on computer hardware, software, peripherals and networking products and services than readers of other networking/LAN publications. No small wonder since CIMS establishes that a significant percentage of computer and related products will be used on a network. Network World, delivers the Very **Influential Purchasers** you need to fatten up your sales — and your wallet. For more information or to request a copy of Network World's IntelliQuest CIMS V1.0 summary, call Evilee Thibeault at (800) 622-1108 x430.

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Compaq readies Pentium server, new book series

BY JOANNE CUMMINGS

Compaq Computer Corp. recently unveiled a Pentium-based server and launched a computer book series with IDG Books Worldwide, Inc.

The server, called the ProSignia 500, uses Compaq's TriFlex/PCI architecture to deliver high performance from the 90-MHz Pentium chip, the firm said. By locating three subsystems – I/O, processor and memory – on three separate high-bandwidth buses, the architecture allows I/O devices and systems processors to simultaneously access memory, reducing bottlenecks.

The ProSignia 500 is a mid-level file server designed for small and midsize businesses. The unit's base configuration includes the Pentium processor, 16M bytes of random-access memory expandable to 144M bytes, and 256K bytes of cache memory.

It has six internal expansion slots: one for an additional processor, three Extended Industry Standard Architecture (EISA), one shared EISA/Peripherals Component Interconnect (PCI) and one PCI slot. The machine also has an integrated 32-bit Ethernet local bus controller, an integrated 32-bit Fast-Small Computer System Interface-2 controller and a 1.5G-byte hard drive.

The base price for the server is $5,400. It is available now.

Separately, Compaq and IDG Books launched a computer book series, with their first title, *The Internet*, being an easy-to-read guide that helps personal computer users navigate the public network.

Written by Paul Hoffman and edited by John Levine, the book offers tips, advice and basic how-to information to help users take advantage of the Internet. Available now, the book costs $24.99.

©Compaq: (800) 345-1518.

Biscom

Continued from page L5

the firm said.

The product enables users to create both individual and group phone books, and the LAN administrator can create public phone books that authorized users can access.

Faxcom for NetWare can concurrently share a Faxcom fax server unit with IBM Application System/400s, mainframes and Digital Equipment Corp. VAXclusters, as long as each is connected to the fax server unit.

So instead of having separate phone lines for each platform, outbound faxes from all systems can be load-balanced by the Faxcom fax server across multiple outbound phone lines. In addition, inbound faxes can be routed using one central routing scheme, regardless of their destination.

Available in the first quarter, a 100-user system, including Faxcom for NetWare NLM, Faxcom 3000 fax server, Ethernet interface and Faxcom for NetWare Windows client software, costs about $100 per user.

©Biscom: (508) 250-1800.

Company offers host print server for Windows NT nets

NetSoft has unveiled a mainframe print server for use with Microsoft Corp.'s SNA Server for Windows NT.

The New Systems (NS)/Print Server is designed to simplify printing of host-based data on LAN-attached printers, according to the company, based in Laguna Hills, Calif.

The NS/Print Server software runs on a Windows NT server and provides for more efficient printing than does typical personal computer-based 3270 terminal-emulation software because it enables host data to travel directly from the SNA Server to the printer without going to the client emulator first.

The software can support as many as 32 concurrent host printer sessions and can handle both LU 1 and LU 3 mainframe datastreams. It supports selectable and scalable printer fonts, and provides full support for SNA Character Stream control settings, including margins, characters per inch, lines per page, and horizontal and vertical tabs.

NS/Print Server also runs as a Windows NT daemon process supporting automatic start-up and remote administration using Microsoft's Remote Access Server.

Priced at $995, the software will be available Dec. 15.

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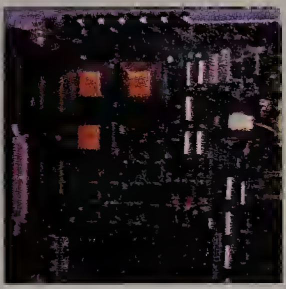

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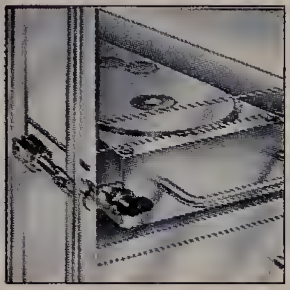

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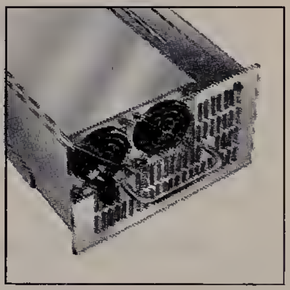

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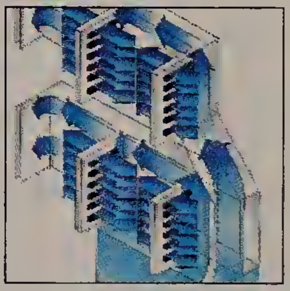

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*Circle Reader Service #***6**

NET RESULTS

by Mark Gibbs

Nets and acceptable uses

During the last few weeks, I have been able to talk to several hundred network managers and computing professionals while conducting *Network World's* Capitalizing on the Internet seminars.

One of the most interesting questions raised is, how do your staff members know what counts as permissible use of their network connections?

In all but a few organizations, the way the staff treats the network is left to chance. It is assumed that staffers will refrain from doing things they should not and that you will be able to deal with the situation if they do something wrong.

Not a good idea.

You know how it goes — "Gee, sorry. I never thought that when I *(fill in some bizarre and system-damaging user action here)*, anything would happen."

Then you have to figure out: how to clean up the mess, how to explain the system downtime to whomever you report and a suitable form of punishment that will not contravene the Geneva conventions.

Few organizations solve such problems before, rather than after, the event by instituting an acceptable uses policy (AUP).

The objective of a corporate AUP is to define what users should not or must not do and, optionally, what they can do.

The opening of the AUP should be a position statement from the chief executive officer or another corporate heavy hitter to give the document gravity.

The CEO's statement should read something like "Dear Employee: The *(company name)* network is the nerve system of our operation. Without this network, you might not have a job. Defending and protecting the network is absolutely vital to our financial well-being...."

The objective of the CEO statement is to not only put the fear of God (or at least the CEO) into the employee, but to also ensure that the corporation is buying into the need to protect the network.

The AUP should then get down to business.

You need to stress that violating the AUP is a bad idea and that to do so will result in disciplinary action.

I always recommend the Attila the Hun approach to discipline: Do something wrong and we will terminate you — you have been warned.

This approach may be too draconian for some, but anything less is usually not taken seriously. You can still make exceptions for honest mistakes.

So what is to be covered by your AUP?

There will be many issues peculiar to your corporate environment, but one of the most general is the requirement for your employees to take passwords seriously and not reveal them to anyone.

Another serious issue concerns the introduction of software to the network. It should be an AUP directive that all software the staff brings in, downloads, creates or acquires by any means must be checked out and certified by the information services department before being used on the net.

If your organization does not have an AUP, you are missing out on a critical management tool.

If you have such a policy or any topics that you think should be included in one, perhaps you would like to share them with your fellow *Network World* readers.

Drop me a note and perhaps we will be able to compile The *Network World* General Acceptable Uses Policy.

INTEL UPDATE

Here's an update on last week's column: Jokes about the bug in Intel's Pentium chip are doing the rounds on the Internet.

Q: How many Pentium designers does it take to screw in a light bulb?

A: 1.99904274017, but that's close enough for nontechnical people.

Q: What's another name for the "Intel Inside" sticker they put on Pentium machines?

A: The warning label.

➡ Gibbs is a consultant and writer in Ventura, Calif. He can be reached at (800) 622-1108, Ext. 504, or on the Internet at mgibbs@rain.org.

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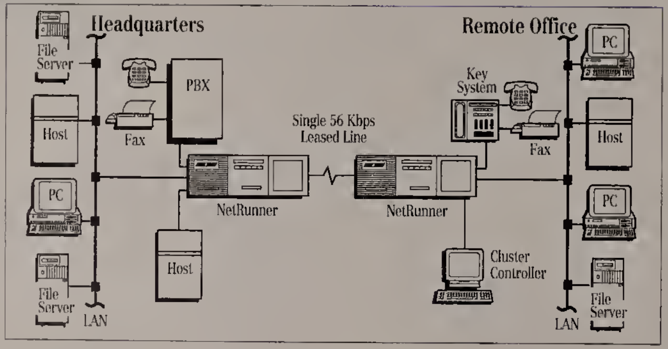

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Circle Reader Service #7

GLOBAL SERVICES

Voice and Data Services, Mobile Computing, Regulatory Issues and Voice CPE

BRIEFS

AT&T last week objected to being singled out by a vendor group on the issue of **frame relay price disclosure.** The carrier was responding to a petition by the Indepedent Data Communications Manufacturers Association (IDCMA) asking the Federal Communications Commission to force AT&T to file frame relay tariffs (*NW,* Dec. 5, page 31). Inter-local access and transport area frame relay is currently exempt from tariff filing requirements, and AT&T said that if the FCC grants the **IDCMA**'s petition, it should apply equally to all interexchange carriers.

The **U.S Navy** has awarded a big integrated services contract to **Bell Atlantic Federal Systems** for its base in Patuxent River, Md., where the Navy expects to consolidate its air operations over the next few years. The contract is also another win for subcontractor **AT&T Network Systems,** which will provide a 5ESS central office (CO) switch with optical remote switches across the campus. The base network will use CO-type switches rather than private branch exchange systems because of the Navy's requirements, including an initial 12,000-line ISDN system, said Tony D'Agata, Bell Atlantic's vice president for military systems.

The **Federal Communications Commission** — one of the few government agencies actually known for hardworking employees — may not escape a pruning under the new congressional regime. In a PBS interview, **Sen. Larry Pressler (R-S.D.),** incoming chairman of the Senate Commerce Committee, said his expected telecommunications reform bill may call for a **cut in the FCC's budget.**

By contrast, FCC commissioners in recent years have asked Congress for dramatic increases in staff to handle a deluge of telecommunications, wireless, broadcast, cable and satellite matters.

Sprint Corp. has announced that its Internet gateway now supports the Multi-purpose Internet Mail Extensions (MIME) protocol for binary file transfer. Under this enhancement, SprintMail users will be able to transfer multimedia files such as financial spreadsheets, video images and desktop publishing documents to Internet users employing the **MIME** protocol.

Bells seek a shot at federal mega-contract

BY DAVID ROHDE

Washington, D.C.

Six of the seven regional Bell holding companies are joining in an effort to get a stake in the next giant federal government contract.

The RBHCs — all but BellSouth Corp. — told the federal government's Acquisition Working Group that it should split the so-called follow-on to the interagency Federal Telecommunications System (FTS) 2000 contract into regional contracts. The working group is charged with devising a general concept for the FTS 2000 follow-on contract.

At the same time, independent systems integrators told the group that the new contract should give federal government users more flexibility by allowing them to choose from a range of local and long-distance service options, all pulled together by one or more integrators.

Both approaches would represent a major departure from the current FTS 2000 contract, which is almost exclusively a civilian agency long-distance arrangement shared by AT&T and Sprint Corp.

The stakes for the follow-on contract are even bigger than they were for the 10-year-old FTS 2000 contract awarded in 1988, since the new contract is expected to include a number of Department of Defense requirements.

In fact, the RBHCs' request for regional awards is partly an attempt to recoup an opportunity that they appear to have lost for a huge chunk of Defense Department business.

Earlier this year, Pacific Telesis Group and US WEST, Inc. teamed to bid on a Defense Department mega-contract split into three regions matching groups of RBHC territories.

But since then, the drive to combine all Pentagon procurements has lost steam. Communications support for the administrative functions of the Defense Department will now be combined with the FTS follow-on, while communications for strictly military functions, such as command and control, are expected to be thrown into a separate arena (*NW,* April 25, page 6).

Along with this, the concept of the three regional Defense Depart-

See **Bells**, *page 40*

Long road, big reward

Schedule for the follow-on contract to FTS 2000:

December 1994	General concept for contract is selected from remaining alternatives.
June 1995	Draft RFP to be released and comments requested.
December 1995	Final RFP to be issued.
July 1996	Proposals are due.
March 1997	One or more contracts to be awarded.
Dec. 6, 1998	FTS 2000 expires; new contract takes effect within 180 days.

SOURCE: ACOUISITION WORKING GROUP OF THE INTERAGENCY MANAGEMENT COUNCIL, WASHINGTON, D.C.

BT steps into U.K. Internet services mart

BY ELIZABETH HEICHLER

London

BT has unveiled the details of its long-heralded plans to provide Internet access services in the U.K., leaving analysts disappointed and competitors unperturbed.

BTnet pricing menu

Service	Connection fee	Annual fee
Leased-line	$1,600	$8,000
Frame relay	$1,600	$5,600
SMDS	$1,600	$5,600
X.25	$1,600	$3,200
ISDN	$800	$4,000
Dial-up	$800	$2,800

The U.K.'s main telecommunications carrier is marketing its Internet services under the name BTnet and is initially offering them only to corporate customers, with residential services planned for six to nine months away.

Beginning in 1995, BTnet will initially provide Internet access via two network points-of-presence in the U.K. — one in London and one in Manchester. Services offered will include electronic mail, a managed mailbox service, a Domain Name Service, a Usenet news feed and the ability to transfer files via File Transfer Protocol (FTP). BT will operate a 2M bit/sec transatlantic link through MCInet and a European link to the EBONE node in Paris.

BT will not provide customers with front-end software, such as networking protocol stacks and user interface tools for E-mail or Internet navigation, said Adrian Edwards, a BT product manager.

BTnet services will be available at up to 64K bit/sec using leased lines, frame relay, Switched Multimegabit Data Service and ISDN. X.25 access at 9.6K bit/sec and V.32bis dial-up modem access will also be supported.

Prices and connection fees vary depending on service (see graphic). BT will also provide a managed router at the customer's site for an additional $1,360 connection fee and $3,200 annual charge.

Commercial Internet access services are already widely available in the U.K. from companies such as Cambridge-based Pipex. BT's market entry offers no real competitive edge over the existing services, according to Sean Phelan, principal analyst for The Yankee Group Europe in Watford, England.

"BT has the sole advantage of very high name recognition," Phelan said. "In the short term, it may

See **BT**, *page 33*

Sprint alliances may come tumbling down

BY DAVID ROHDE

Washington, D.C.

Sprint Corp.'s alliance with France Telecom (FT) and Germany's Deutsche Telekom (DT) is in danger of falling victim to major, or even crippling, restrictions.

At a time when observers say European carrier monopolies should be torn apart faster to most benefit users, Sprint's competitors have launched an attack on the alliance based on the monopoly issue.

If the Sprint deal is not approved, the company will be out the $4.2 billion it expects to glean from FT and DT to help pay for investments such as broadband personal communications services (PCS) licenses it hopes to win in FCC auctions now under way.

AT&T and MCI have told the Federal Communications Commission that the Sprint deal does not meet the requirements for reciprocity set out in the FCC's approval of MCI's alliance with BT because the British market is opening up while the French and German markets are essentially closed.

In a response filed with the FCC last Monday, Sprint attorneys emphasized that it needs the new money from FT and DT to foster further innovation.

"AT&T, a corporation far larger than Sprint, fails to appreciate the problems Sprint would have in raising such large sums through the open market," company attorneys pleaded. "[AT&T] does not take cognizance of the rapidly evolving developments — such as the PCS auctions that began today, the possible opening of local markets to competition, broadband interactive video services and the like — which require large sums of capital if Sprint is to participate fully."

Sprint earlier had argued that the French and German markets are partly open for private-line, packet-switched and equipment services, while switched voice telephony markets there are slated to open up on Jan. 1,

See **Sprint**, *page 40*

MFS, PacBell link frame relay services

BY DAVID ROHDE

San Francisco

In what may be a preview of end-to-end frame relay services from big long-distance carriers, MFS Datanet, Inc. has completed testing a link with Pacific Bell, and the two companies are offering a coordinated frame relay service to California customers.

The service will save customers 30% to 40% more than using leased lines to access inter-LATA frame relay services, according to Pacific Bell officials. Although MFS Datanet is an affiliate of the competitive access provider MFS Communications Company, Inc., MFS Datanet offers frame relay nationally and internationally over its global Asynchronous Transfer Mode backbone.

There are presently no customers for the combined service.

Although the two companies are labeling the service as one-stop shopping, the arrangement does not actually offer a single point of contact.

If Pacific Bell representatives offer the service, the reps will ask customers if they have a preferred interexchange carrier (IXC), said Jay Jonekait, vice president of business development for MFS Datanet. If not, the Pacific Bell rep will suggest MFS Datanet.

The two companies will then offer separate proposals and bill separately, according to Jonekait and Mike Liebe, Pacific Bell's product manager for fast-packet services.

BELLCORE'S WORKSHOP

The order provisioning should be partly expedited because the two providers will share some of the frame relay ordering specifications recently outlined by the Frame Relay Interconnection Workshop sponsored by Bell Communications Research, Liebe said.

The workshop is defining a frame relay extension to the electronic Access Service Request (ASR) now typically used by IXCs to send requests for local access private lines on behalf of customers to local exchange carriers (*NW*, Sept. 19, page 1).

Pacific Bell and MFS Datanet plunged ahead even though the interconnection workshop details are not complete, Liebe said.

"It's not a fully mechanized ASR process at this time," he added.

The two companies also will pitch other advantages. MFS Datanet's ATM backbone, for example, enables it to support frame relay links of 6M bit/sec, instead of the usual 1.5M bit/sec, Jonekait said.

"We put the ATM backbone in place for LAN interconnect, and then we realized you could do frame transport," he said.

Because its only business is connecting computers, MFS Datanet committed to ATM using equipment from Newbridge Networks, Inc. and General DataComm, Inc., despite the lack of complete standards, Jonekait said. MFS Datanet does not offer voice or video services over its ATM network. ▣

SITA maps out plan to offer voice services worldwide

BY TIM GREENE

Atlanta

The SITA Group has announced its intention to offer switched voice services worldwide by the second half of next year, adding to its existing array of data offerings targeted at airlines and other travel-related companies.

Initially, the Intelligent Global Voice Network will be available in the U.S. and Western Europe, but it will expand where national regulations allow, according to Duke Dickson, general manager of Scitor ITS, a subsidiary of SITA.

Voice services will feature standard virtual private network offerings, including speed dial and call center management services such as call sorting.

Price structuring was still under way but will be announced soon, Dickson said.

SITA will initially target its current travel-related customer base, Dickson said, but the company hopes to expand to a more general business audience.

SITA plans to install three central office switches — in North America, Europe and the Asia Pacific region —to upgrade its high-speed data network to voice.

As demand grows and more switches are required, SITA will add them, Dickson said.

The company has not yet decided which vendor's switch it will use, he added.

Dickson said the exact architecture of the voice network was flexible but SITA would try to avoid relying on other existing networks to avoid signal degradation.

He said he believes that SITA will be unique in being able to provide both a voice and data network worldwide.

John Coons, a telecommunications analyst with Dataquest, Inc. in San Jose, Calif., said SITA already holds a large portion of the airline market for data communications.

SITA will initially target its current travel-related customer base, but the company hopes to expand to a more general business audience.

SITA's entry into voice may be driven by demand for it from current customers, Coons said. At the same time, it would position SITA to compete for international voice customers beyond its current client base.

"They may be trying to position themselves," he said.

That market is projected to reach $45 billion by the year 2000, according to International Data Corp., which is based in Framingham, Mass.

Coons set the current international data networking market at $2 billion. ▣

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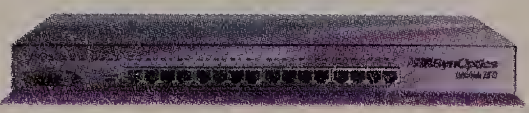

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WilTel announces discount pricing plan

A firm's long-term commitment can result in lower rates for T-1 local access lines.

BY TIM GREENE

Tulsa, Okla.

WilTel has announced term discounts as high as 31% for users that coordinate T-1 local access lines through the company.

Under the arrangement, WilTel coordinates access with local exchange carriers (LEC) and passes along a term discount offered by the LECs. Formerly, WilTel took orders only month to month without discounts.

The discount is available only in certain areas because some LECs are not offering it, said Dale Thompson, WilTel's manager of commercial services.

Currently, the largest current discount offered by any of the LECs is 31%, offered on a five-year commitment with GTE Telephone Operations in Texas only.

The discounts are subject to change by the LEC, but whatever discount is in effect when the customer signs will hold for the term of the agreement, Thompson said.

The discount is available to commercial and carrier customers, and applies to monthly recurring charges. WilTel charges a $25 order processing fee.

Customers that sign long-term agreements have flexibility in which WilTel services they access, he said. For example, a customer could start off with a T-1 access line connected to a private line under a three-year agreement and later switch to WilTel's frame relay service.

Other carriers already offer T-1 local-loop discounts, according to Eric Paulak, associate publisher at the Center for Communications Management Information in Rockville, Md.

AT&T offers discounts from 2% to 7% with a minimum commitment of two years and a maximum term of five years. Customers must also agree to minimum monthly payments ranging from $5,000 to $1 million.

For example, a customer that spends $5,000 per month can get a 2% discount with a one-year commitment; 3% under a three-year deal; and 4% for either a four- or five-year commitment, Paulak said. Those that commit to a five-year term and spend $1 million per month would receive a 7% discount.

WilTel's T-1 local access discount plan

Local carrier	1 year	2 years	3 years	4 years	5 years
Ameritech	6%	—	17%	—	25%
Bell Atlantic	—	7%	17%	—	26%
BellSouth	—	7%	—	9%	—
GTE Telephone Operations (Texas)	2%	—	17%	—	31%
NYNEX	—	—	15%	20%	25%
Pacific Bell	—	—	—	—	—
SBC	—	—	—	—	—
SNET	5%	—	15%	—	25%
US WEST	—	—	7%	—	15%

Discounts are passed through from LECs and are subject to change.

MCI Communications Corp. and Sprint Corp. offer identical discounts of 5% to 24% for one- to five-year commitments. Both companies set their pricing using rate bands, so a customer would have to contact the companies to determine the exact rate and discount, Paulak explained.

MCI, Sprint and now WilTel are moving toward discounts because AT&T has a drastic point of presence advantage, particularly in metropolitan areas, said Christine Heckart, a senior consultant with TeleChoice, Inc., a Verona, N.J., consulting firm.

That means an AT&T POP may be miles closer to a customer than the nearest MCI or Sprint POP, giving AT&T a price advantage the other carriers cannot overcome in their end-to-end rates, even if rates on their own interexchange carrier (IXC) lines are competitive.

Profit margins are too tight on IXC rates to squeeze them much more, hence the local-loop discounts on long-term buying, Heckart said.

"The payback is a lock-in by the client," she said.

WilTel said that in addition to passing on the LEC discounts, merely offering end-to-end service attracts customers. By making arrangements with the LECs for customers, WilTel offers one-stop shopping that can save the customer from having to negotiate deals with individual LECs at the ends of links, according to the company.

BT

Continued from page 31

allow them to get away with launching an overpriced, limited service."

ADVANTAGE, BT?

Because BT's entry will validate Internet services, it may ultimately benefit the "real Internet providers" more than BT itself, with competitors easily able to publish price lists showing 30% to 50% lower prices, he said.

"BT is undoubtedly playing catch-up, but this kind of initiative is not going to achieve catch-up," Phelan added. "I'm very disappointed in BT; it is behaving like a pre-perestroika carrier. We've seen so much innovative, customer-facing behavior by BT in Europe, it's a pity it can't do the same in its home market."

The immediate effect of BT's announcement on competitor Pipex, which is currently the largest U.K.-based commercial Internet services provider, is to have validated the market for industry, said Peter Dawe, managing director of Pipex's parent company, Unipalm.

"They will learn that validating a market doesn't mean profits or market dominance, however," he added.

"We have better connections to other Internet services than BT has, including two transatlantic lines and multiple links to Europe," Dawe said. Pipex also has broader geographical coverage, with eight POPs in major U.K. cities and 12 POPs in Europe.

➡ Heichler is a senior European correspondent with IDG News Service.

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RATE & TARIFF MONITOR

by Eric Paulak

MCI takes a queue from the post office

If you use MCI for your inter-LATA, intrastate dial-1 service, it may be time to find a new carrier.

Just as the U.S. Postal Service is raising the cost of a stamp, you're also going to get hit with a rate hike if you use MCI to make a lot of short-haul toll calls within a state.

What's happening? MCI is switching from mileage-sensitive pricing to postalized rates. Nine states have been switched in the last month and a half: Indiana, Maine, Massachusetts, Minnesota, North Dakota, New Hampshire, Rhode Island, Texas and Vermont. Any MCI call within these states — no matter the distance — will cost the same on a per-minute basis.

That means if the majority of your in-state traffic is short distance, you're in for big hikes.

Here's how the postalized rates compare to the old mileage-based format:

In Texas, the old rates were $.085 to $.310 for the first minute and $.0673 to $.3075 for every minute thereafter, depending on the distance of the call. So, for example, a 10-minute, 20-mile call would cost $.085 for the first minute and $.0673 per minute for the next nine minutes, for a total of $.6907.

At 100 miles, the same call within Texas costs $.2850 for the first minute and all subsequent minutes, for a total of $2.85.

With the new postalized rates, all calls, regardless of mileage, cost $.2818 per minute. So, for a 10-minute call, MCI charges $2.818.

For any calls over 100 miles, the new rates save you money. But for calls under that 100-mile mark, you're now paying higher rates.

How high? For the 20-mile call in Texas, switching to postalized rates resulted in a 50% increase.

MCI's postalized rates have an even worse impact for short-haul callers in Minnesota. The old rates were $.1600 to $.5100 for the first minute and $.0690 to $.3842 for every minute thereafter, also depending on distance.

A 10-minute, 10-mile call costs $.1600 for the first minute and $.0690 for every minute thereafter, for a total of $.781.

Under the new postalized rates, Minnesotans are paying $.2974 per minute. So that same 10-minute call now costs $2.974 — an incredible 281% increase.

When a carrier switches to postalized rates, it usually means that, along with the losers — in this case, those who make short-distance calls — there are some winners who see their rates drop. With MCI's rate changes, however, that isn't always the case.

For example, in Texas — where calls can easily span hundreds of miles — the maximum you could have been charged for a 10-minute, in-state call under the old plan was $2.85. With postalized rates, your cost is $2.818. That is a savings of 3.2 cents. Money is money, but 3.2 cents isn't a big deal.

In Minnesota, on the other hand, long-distance callers can see real savings.

Under MCI's mileage-based rates, the maximum you could have been charged for a 10-minute call was $3.771. With postalized rates, the cost is $2.974, a savings of 79.7 cents.

Why the big disparity between states? Where allowed by the state public utility commissions (PUC), MCI is squeezing the maximum out of callers, resulting in net overall increases.

In states where the PUC requires rate changes to be revenue-neutral, however, there are winners and losers.

The problem, however, is that more and more state PUCs, as well as the FCC, are taking a hands-off approach to regulating telecommunications, and carriers are putting through rate changes that are good for them.

So in states like Massachusetts, Texas and Vermont, where there are more losers than winners with the new postalized rates, you may want to look at what AT&T and Sprint are offering. With mileage-sensitive rates, they may be your best bet.

➜ Paulak is associate publisher for the Center for Communications Management Information, a provider of rate and tariff information in Rockville, Md. He can be reached at (301) 816-8950, Ext. 327.

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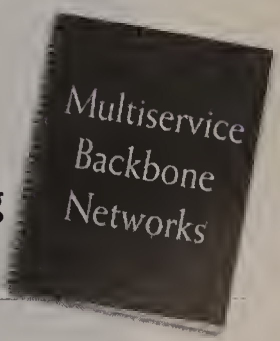

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*Circle Reader Service #***41**

Bells

Continued from page 31

ment contracts appears to be dead, according to Warren Suss, president of Warren H. Suss Associates, a consultancy in Jenkintown, Pa.

The concept — built largely around the expectation that the Modified Final Judgment (MFJ) restrictions on RBHCs would be abolished by Congress — was judged impractical, Suss said.

"You would have to go through heroic measures to make sure everything communicated across the regions," he said.

The RBHC plan is essentially one of eight general concepts under consideration by the Acquisition Working Group — one of which is designated to be chosen by the end of this month. FTS 2000 expires in 1998 (see graphic, page 31).

Since a region would extend far beyond the legal calling areas of a Bell operating company, the RBHCs would have to seek MFJ waivers just to participate in a bid, according to Robin Flowers, senior account manager for federal accounts at NYNEX Corp. in New York.

While the Acquisition Working Group is leaning against a strict regional route, Suss said, it is considering options that build more flexibility into the contract.

One option would allow agencies to choose their own local access methods, in addition to a separate long-distance contract.

Also, more flexibility should be built into the follow-on contract to distinguish between core services and leading-edge services that are "commercially available but not widely deployed," Flowers said.

Federal agencies should be able to go to sources other than the prime contractors to get these leading-edge services, he added. ☒

Sprint

Continued from page 31

1998. But AT&T and MCI argued that even this limited competition is essentially an illusion.

For example, in both countries, resale of domestic and international private lines is permitted only if it does not involve interconnection to the public switched telephone network (PSTN) at both ends, said MCI attorney John Scorce.

As a result, Scorce said, competitors' offerings are limited to so-called closed user groups. That would be analogous to private or virtual private networks in the U.S., where there was no off-net dialing option.

BENHAMOU: 3Com's networking costs are up to four times higher in Europe.

Scorce cited a July 15 letter from FCC Chairman Reed Hundt to Rep. Edward Markey (D-Mass.), who, at the time, was House Telecommunications Subcommittee chairman.

"I share your concern about the lack of liberalization of foreign telecommunications markets, particularly in instances where dominant foreign carriers are forming alliances with individual U.S. carriers," Hundt told Markey.

EUROPEAN VIEWPOINT

Meanwhile, the European Union (EU) — a cooperative of mostly Western European countries, soon to add to its 12 member states — has defined and heated up the debate by sponsoring two bellwether reports that weigh how its member governments should foster a multinational infrastructure for a new world of multimedia services.

The 1993 "White Paper on Growth, Competitiveness and Employment," drafted by commission President Jacques Delors, and the follow-up June 1994 Bangemann Report, penned by a group of senior information technology executives, home in on the debate.

Central to the reports was the argument that an information-based society must be at the heart of the EU's efforts to restore the competitiveness of its industry, promote growth and create jobs. The Bangemann Report was especially strong in taking the stance that protection of national telecommunications monopolies hinders growth of the information society.

"Change in Europe seems to come about through inertia rather than through deliberate economic and political decisions. There is no real sense of urgency," complained Carlo De Benedetti, chief executive officer of Ing. C. Olivetti and a member of the Bangemann Group, at a recent industry conference in Rome.

Industry leaders agree that government-protected monopolies have driven up the cost of doing business, dampening demand for on-line services.

"3Com's own networking costs are three to four times higher in Europe than in the U.S.," said Eric Benhamou, chairman and CEO of networking vendor 3Com Corp. of Santa Clara, Calif., which conducts about 40% of its business in Europe.

➺ IDG News Service reporters contributed to this story.

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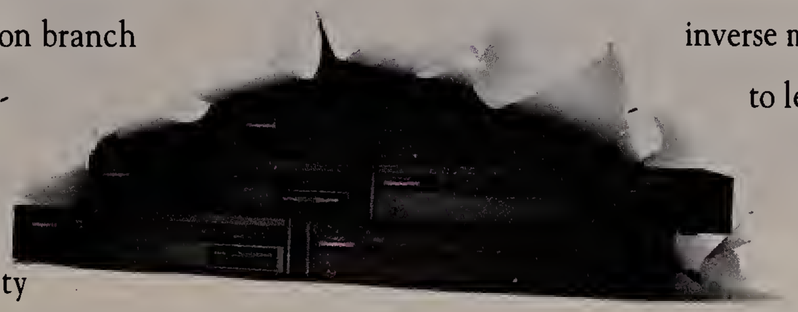

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*Circle Reader Service #***35**

BRIEFS

Fulcrum Technologies, Inc. and **Fujitsu, Ltd.**'s TeamWare division have reached an agreement to integrate Fulcrum's **text retrieval** software into TeamWare's groupware line. TeamWare will build Fulcrum's SearchServer text retrieval engine into its TeamWare Library document management software and will make the technology available early next year.

Unified Communications, Inc. (UCI) recently announced a new version of its **electronic messaging switch.** Version 2.2 of the Unified Networking System adds rules for administering directory synchronization and for determining security access levels.

The switch can connect a variety of disparate mail systems, including Microsoft Corp.'s Microsoft Mail, Lotus Development Corp.'s cc:Mail, Simple Mail Transfer Protocol systems and those based on Novell, Inc.'s Message Handling Service (MHS).

It also can connect to mainframe and X.400 systems. Connectivity to Lotus Notes and support for the Multi-purpose Internet Mail Extensions is planned for later this month.

The messaging switch runs on a variety of Unix platforms.

UCI: (612) 851-1710.

CE Software, Inc. of West Des Moines, Iowa, recently said it will work to integrate its **calendaring** software with Hewlett-Packard Co.'s OpenMail messaging switch software. CE said it hopes to release an OpenMail version of Network Scheduler in early 1995.

CE: (800) 523-7638.

GE Information Services (GEIS) of Rockville, Md., recently announced an **electronic mail** client that connects users of Microsoft Corp.'s Microsoft Mail with incoming E-mail, conferences and electronic data interchange messages. The new Business Network software puts all of these messages into the Microsoft Mail interface and supports X.435 specifications for linking E-mail with EDI. It works with GEIS' value-added network services, as well.

The software is set to ship in the first quarter of next year with versions for Windows, Macintosh and DOS users.

Pricing starts at $250 for a one-user license, with EDI pricing starting at about $1,000 per client.

GEIS: (301) 340-4000.

Foresight Corp. of Columbus, Ohio, last week said several **electronic data interchange** vendors and users have adopted its specification for disseminating EDI standards and conventions. Foresight's Standards Exchange Format provides a template for electronic distribution of EDI agreements among trading partners.

Among those adopting it are the Department of Defense, Sterling Software, Inc., TSI International and Advantis.

The format is in the public domain, and documentation is available free of charge.

Foresight: (614) 791-1600.

DB/EXPO crowd hunts for right tools

On the prowl for Windows-based power tools and object-oriented software.

BY BARB COLE

New York

The holiday shoppers have descended on the city here, and among them last week were DB/EXPO 94 conference attendees seeking application development tools that fit their needs.

"Our requirements are more sophisticated now. We want a graphical tool that lets us develop one application and deploy it across Windows and Macintoshes," said Janet Bowen, senior systems analyst at New York University Medical Center.

Bowen said she is currently developing client/server applications with Gupta Corp.'s SQLWindows that access Oracle Corp.'s Oracle7 and Sybase, Inc.'s SQL Server databases.

"We know that Gupta is coming out with a cross-platform version, but we just can't wait," she said.

Ken Voth, a database developer at Physicians Corp. of America in Wichita, Kan., said, "We're looking for a graphical development tool that lets us develop an interface our users can access without knowing SQL."

In addition to ease of use, Voth values the ability to connect to multiple databases. He also wants a tool that can be used to build applications designed to run on portable computers.

Rick Phillips, associate director of MIS at Family Health International, Inc. in Durham, N.C., complained that "most Windows application tools have been buggy."

Phillips, who uses Oracle Rdb databases and front-end tools from Sapiens, Inc., said he was on a mission to replace his aging front-end technology, too.

THE SCOOP ON OOP

The hope of finding object-oriented programming (OOP) tools drew Kevin Watson, a database administrator at Medco Data, Inc. of Montvale, N.J., to the show.

"We're ready to clean up the data we have and make the move to objects because we believe it will save us development time and ease development," Watson said.

"I don't know much about OOP, but I know that it will be important in the next few years," said Connie Nong, an engineer at Unisys Corp. in Bayside, N.Y., as she hunted for development tools that exploit object-oriented technology.

But development tools were not the only sought-after items at DB/EXPO.

LOOKING FOR TOOLS

Patricia Moore, network manager with The Dun & Bradstreet Corp. located in Berkeley Heights, N.J., hunted for diagnostic tools that could help the company better find and solve problems on its client/server system.

"I find it frustrating to know that I have a problem on the network but not know what it is," Moore said.

"Client/server results in a lot of fragmentation," she said. "There are so many things that can go wrong." Z

For the record

"We want development tools that support open systems. We don't want our clients to have to buy special hardware."

Ken Voth

"In the days of the mainframe, you had a cohesive view of your system and could pinpoint problems. With client/server, problems can arise on several different levels of the system."

Elizabeth Horan

DATABASE ACCESS

Cross Access revs up middleware upgrade

BY BARB COLE

Chicago

Cross Access Corp. last week rolled out Version 2.0 of its CrossAccess Data Delivery System, an upgrade of its middleware that delivers data faster and works with a wider variety of client applications and databases.

The company has added support for Microsoft Corp.'s Open Database Connectivity (ODBC) specification to its client/server software, giving desktop applications access to a variety of ODBC-compliant databases, including those from Computer Associates International, Inc., IBM and Oracle Corp.

With ODBC, users said they can more easily hone in on the data they wish to access from server or host-based databases, thus reducing network traffic.

"We were bringing down too much data because the [Cross Access] SQL only allowed us to drill down to a certain level. Now we can send more detailed SQL statements to DB2 through the ODBC driver," said Will Henry, a database administrator at a food manufacturing company in the Midwest.

Version 2.0 also provides the ability for ODBC-compliant applications written with Powersoft Corp. PowerBuilder to update relational databases. This capability will be extended to other ODBC-com-

See Cross Access, *page 48*

Reality ✓ Check

Product:
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Company:
Cross Access

The benefits:

- Lets ODBC-compliant applications update relational and nonrelational databases.
- Gives COBOL-based CICS applications access to nonrelational data stored on platforms not under CICS control.
- Works with Oracle7 database (previously worked only with Oracle6).

The drawback:

- Can only update ODBC client applications built with Powersoft's PowerBuilder.

The user view:

"With the previous version, we were at the point where if the access to DB2 was any slower, it would be easier to get hard copy. But this version is definitely faster."

Will Henry

NCD will provide secure banking over the Internet

BY ADAM GAFFIN

Boston

Network Computer Devices, Inc. (NCD) has announced plans to integrate its Internet mail client software with a nascent electronic commerce offering from First Virtual Holdings, Inc. to provide a secure means of conducting financial transactions over the Internet.

First Virtual has developed an Internet-based shopping scheme that relies on World-Wide Web client/server technologies to allow on-line shopping without the need for public-key cryptography. NCD's Z-Mail, which comes in Macintosh, Windows and Unix versions, will use the Multi-purpose Internet Mail Extensions to display messages from First Virtual to the user.

With the system, potential shoppers first apply for a First Virtual account, similar to the way they would for a credit card. If accepted, users can select items from the Web-based "storefronts" of participating merchants. The requests go to a First Virtual server,

See NCD, *page 46*

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NCD

Continued from page 43

which then sends messages to users' electronic mail address, asking them for authorization for the purchases.

The Web is an international network of databases and information resources connected via hyperlinks, which let users connect to different servers through simple mouse clicks. It has become the dominant arena for companies that are seeking to set up shop on the Internet.

Einar Stefferud, First Virtual's official chief visionary, said this method protects against fraud because users can simply turn down any authorization requests for purchases they did not make themselves. Stefferud said First Virtual would then investigate any frequent attempts to charge something to a recalcitrant user and added that the method does not require any special security-enabled client software.

If the user responds to the query and shows a willingness to pay, the transaction is billed to the user's credit card number, and the vendor is paid through First Virtual.

While that provides some level of security, a user who logs as someone else, using a stolen password for example, could foil the system.

COMPETING SYSTEMS

First Virtual and a similar system from Open Market, Inc. of Cambridge, Mass., will be competing against offerings from such vendors as Netscape Communications Corp. of Mountain View, Calif., which rely on public-key encryption to authenticate and encrypt commercial transactions on the network.

Netscape last week inked a deal with BankAmerica Corp. to use Netscape's Web client as part of an on-line transaction system. The Netscape client relies on technology from RSA Data Security, Inc. Last week, Spyglass, Inc. announced that it will be incorporating the same technology in its Mosaic Web clients.

Meanwhile, the University of Southern California (USC) recently released a beta version of its software, dubbed NetCheque, that relies on Kerberos security technology to authenticate users. The goal is to create a system that lets users send the on-line equivalent of checks, using an embedded digital signature. Recipients will then have to "endorse" any payments with their own digital signature.

According to observers, it is too early to say who will win the Internet security battle, let alone whether users will actually want to buy products and services over the network.

"Security right now on the Internet is at best uneven, and some would say it's even kind of a joke," said Mitch Kapor, cofounder of the Electronic Frontier Foundation and a cyberspace aficionado.

✆NCD: (415) 898-8649; First Virtual: (619) 234-1300 or http://www.fv.com on the Web; Spyglass: (708) 505-1010; USC: http://nii-server.isi.edu/info/NetCheque/ on the Web.

➾ IDG News Service Correspondent Martin LaMonica contributed to this story.

Internet transaction security options

Public-key encryption — Relies on clients and servers enabled with public-key encryption and authentication software. Clients from one vendor may not work with servers from another.

Credit card systems — Work similarly to the way regular credit card companies do. Vendor establishes a secure server containing users' financial information. When purchase request comes in, users are "challenged" via E-mail to verify that they sent the request.

Internet checks — Rely on Kerberos software for authenticating the identity of users, who can fill out on-line forms similar to checks, and vendors, who then try to cash them.

INTERNET *tip*

BY ADAM GAFFIN

One in a series of occasional tips on Internet-based information services.

Ingres databases

ADC Telecommunications of Minneapolis maintains Web and FTP sites related to CA's Ingres database line. Resources include:

- ✓ **Utility applications**
- ✓ **Answers to frequently asked Ingres questions**
- ✓ **Copies of papers from Ingres conference**

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SHARED LOGIC

by Mike Rothman

An open letter addressed to St. Nicholas

Dear Santa:

I've been a bad boy, causing trouble and saying mean things (even if they were true). I won't lie because I know you speak with Hewlett-Packard Co. and you keep that long list of my yearly transgressions.

But I usually don't ask for much, and this time I really need some help. I know in the past I haven't been a believer, and I even cheered for the Grinch to steal Christmas. Come on, Santa, admit it; it's funny when he tries to staple the antlers to his dog's head.

Why don't we bury the hatchet and make amends — I really need some help this year. 'Tis the season, and my clients could use some holiday cheer.

You see, Santa, 1994 was supposed to be a banner year in the messaging world. The next generation of client/server messaging platforms was scheduled to be delivered, satisfying the need for a scalable enterprise messaging backbone. Needless to say, we are all still waiting with bated breath for the next generation to appear.

The users are growing restless, continuing to demand LAN-based electronic mail while also asking for group calendaring and other messaging-based applications.

Of course, network managers must roll out these technologies with zero incremental head count, maintain connectivity to all of the legacy systems and provide quick message forwarding throughout the global enterprise. Sounds pretty bleak, eh?

I don't even think spiked eggnog will do the trick.

And the vendors have been no help. The folks in Cambridge, Mass., and Redmond, Wash., say the right stuff but have had little success delivering products. My friends in Cupertino, Calif., have product but no marketing. It's even harder to tell what's going on in Provo, Utah.

I have no choice but to go to a higher authority.

So after you are done making all the Betsy Wetsy dolls, Mighty Morphin Power Ranger figures and dreaded Barney stuff (can you believe kids like that purple thing?), do you think a few elves could be assigned to my project?

For starters, can we have a system with scalability up to a few thousand users per server; multiplatform support so that my clients don't have to choose; Simple Network Management Protocol support; lots of third-party developers to make the system a true application platform; gateways to coexist with the unfortunate souls stuck on legacy platforms; and tools so users can develop their own messaging applications.

Oh, and how about natively supporting the major application program interfaces and leveraging the enterprise directory?

Can we also get digital signatures on our messages and encryption over the wire?

What about leveraging the Internet for transport and maintaining full message integrity?

While I'm getting fancy, how about a way to transparently access corporate data in relational databases and eventually migrate to a more transaction-based environment?

By the way, I need this yesterday. I know it seems like a lot, but you don't have to start from scratch.

Most of these technologies are already developed; you just need to integrate them. That's the problem; no one vendor has the whole solution.

I guess all I want for Christmas is a scalable, enterprisewide, manageable, client/server messaging back end from a vendor that can make it a strategic application platform. Is that too much to ask?

Your pal,
Mike

➡ Rothman is director of GNS Consulting for META Group, Inc., a consultancy in Reston, Va. Feedback is welcome either by E-mail at MikeR@metagroup.com or by phone at (800) 622-1108, Ext. 521. Rothman's column alternates in this space with that of Marc Myers, president of Client/Server Connection, Ltd.

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Circle Reader Service #33

Avalon assembles a graphical client/server software application

BY TIM GREENE

Tucson, Ariz.

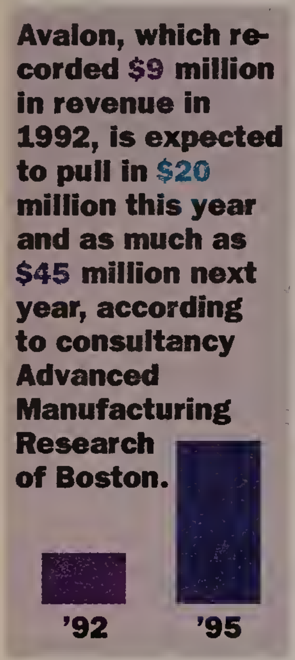
Avalon Software, Inc. has announced an upgrade of its client/server software designed for manufacturing, distribution and financial applications that for the first time supports Windows and Motif users.

Avalon 9, like earlier versions, runs on Oracle Corp. databases at the server. But previous versions only supported dumb character terminals or personal computers emulating terminal mode on the client side.

The new release is also designed around a new architecture that puts 80% of the application logic in the server database, freeing up client workstation processing space and preserving the integrity of shared data stored on the database, according to Oracle.

Previously, the logic resided in a separate application layer on the client or the server, but not on the database itself.

The new architecture also reduces network traffic by supplying clients only with specific data requested. Before, the server often would supply more information than it was asked for, and the client would have to sort through it.



Avalon, which recorded $9 million in revenue in 1992, is expected to pull in $20 million this year and as much as $45 million next year, according to consultancy Advanced Manufacturing Research of Boston.

Financial features of the Avalon 9 software allow for using foreign languages and currency, as well as keeping separate books for corporate divisions, which might operate on different fiscal years.

Avalon has also released an add-on product to Avalon 9 called Avalon Supply Analyst, an offering that lets users graphically represent data to grasp key data quickly.

For example, the software could depict outstanding purchase orders on a bar graph side by side with material required to meet existing orders. If the bars are the same height, the user sees that enough material has been ordered. If the bars are uneven, graphically "stretching" the purchase order bar will also give the user a character readout of how much more material must be ordered to meet the requirement.

The new releases put Avalon among the top five companies producing client/server software for the manufacturing industry, according to Bruce Richardson, an analyst at Advanced Manufacturing Research of Boston. The others are: SAP A.G., Oracle, Baan International and Qad, Inc.

Avalon 9 will be available in the first quarter of 1995 for Unix and Oracle database servers connected to Windows-, Motif- and character-based clients. Prices range from $100,000 to $1 million, depending on hardware configuration, number of users and number of modules purchased.

Avalon Supply Analyst starts at $5,000 per user.

✆Avalon: (602) 512-2000.

Ramco deposits new financial apps

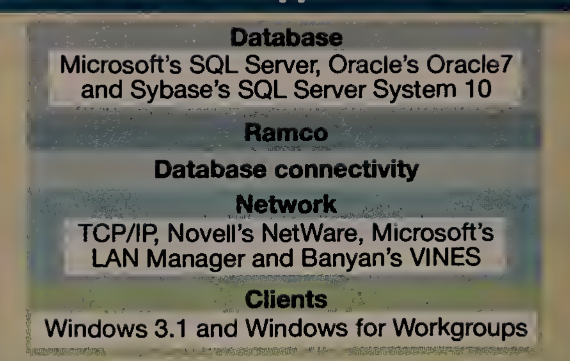
BY BARB COLE

Sunnyvale, Calif.

Ramco Systems Corp. this week will add five financial management modules with built-in electronic messaging hooks to its suite of object-oriented client/server applications.

The new modules — General Ledger, Accounts Payable, Accounts Receivable, Fixed Assets and Purchasing — bring Ramco's client/server application collection to 14.

Where Ramco applications fit in



Database
Microsoft's SQL Server, Oracle's Oracle7 and Sybase's SQL Server System 10
Ramco
Database connectivity
Network
TCP/IP, Novell's NetWare, Microsoft's LAN Manager and Banyan's VINES
Clients
Windows 3.1 and Windows for Workgroups

Ramco's client/server applications work with databases on the server side and take in information from MAPI-based electronic messaging systems on the client side.

GRAPHIC BY TERRI MITCHELL

The applications work with Microsoft Corp. SQL Server, Oracle Corp. Oracle7 and Sybase, Inc. SQL Server System 10 databases and the Unix operating system at the server, while supporting Windows on the client side.

The new modules, like the existing ones, allow users to employ E-mail to automate workflows. The modules support Microsoft's Extended Messaging Application Programming Interface, enabling the applications to work with various MAPI-based E-mail systems, including Vendor Independent Messaging (VIM)- and Message Handling Service (MHS)-based systems.

The messaging hooks let users link tasks and route requests to the appropriate person, department or vendor, said Wallace Luke, vice president of sales and marketing at Ramco.

Ramco applications communicate with other applications using Microsoft's OLE 2.0 and Open Database Connectivity technologies.

"The workflow hooks are not unique but definitely give this software a competitive advantage because they work across a broad line of client/server applications," said Claire Gillan, an analyst at International Data Corp. in Framingham, Mass.

Users were enthusiastic about the workflow hooks, and cited other features that could make the modules useful. Leo Kao, MIS manager at Rohm Semiconductor Corp. here, said the Ramco software lets him set up applications separately for the parent company and subsidiaries, an option not offered in many other packages.

Available now, pricing for the financial modules start at $40,000.

✆Ramco: (408) 522-8080.

Cross Access

Continued from page 43

pliant application development tools in the future, said Raymond Nawara, chairman, president and chief executive officer at Cross Access.

PASSING DATA IN BLOCKS

Additionally, instead of transferring data across the network in rows or records, information can now be passed in user-defined message blocks, Nawara said. As a result, data can be delivered up to 400% faster than with the old version, he added.

Henry confirmed that the new version is significantly faster than the previous release.

Also, homogeneous record joins are performed with less demand on system resources because Version 2.0 can more efficiently optimize record keys, which act like markers to identify data.

Available now, pricing for CrossAccess 2.0 starts at $30,000. Pricing for enterprisewide licenses begin at about $200,000 for IBM mainframe configurations.

✆Cross Access: (708) 954-0500.

RTS intros Business First, software to track customer service contracts

New software works with Oracle and Sybase servers.

BY ADAM GAFFIN

Waltham, Mass.

Relational Technologies, Inc. (RTS) has released client/server application software aimed at helping companies run their customer service centers.

RTS, whose parent company is based in Israel, says its Business First software line will provide customer support administrators with tools similar to those long enjoyed by administrators in other corporate departments for handling personnel and contracts.

At the heart of Business First is a server module, dubbed Contract First, that allows users to track service contracts, including contract length and special provisions.

Service centers have often been treated as afterthoughts and the people running them were often left cobbling together homegrown applications on corporate mainframes.

The client/server software, which also includes modules for administering repair centers, stockrooms and incoming service calls, relies on relational databases from Oracle Corp. and Sybase, Inc., running on a variety of Unix servers.

Windows- and Unix-based client software mainly handles data input and presentation. The client software communicates with the server software via SQL queries over TCP/IP or IPX/SPX.

According to Glenn Martin, vice president of marketing at RTS, many companies promise their customers service and support as a way to make sales.

But service centers have often been treated as afterthoughts and the people running them were often left cobbling together homegrown applications on corporate mainframes, he said.

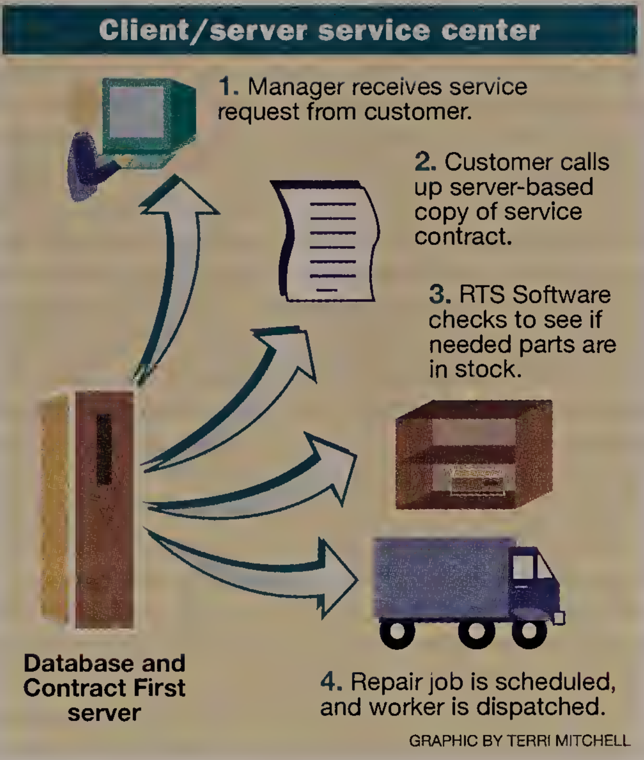
Increasingly, however, corporations are demanding that service centers contribute to corporate profits. That means that companies need to keep better track of service center personnel and inventory, according to Martin.

RTS is looking at ways to beef up its Business First software by adding links to other client/server applications, such as financial packages, as well as adding support for mobile users.

Jeff Kaplan, director of the Dataquest Worldwide Services Group in Framingham, Mass., said RTS offers a potentially unique package in a small and fragmented market by combining several modules needed to oversee the delivery of service.

However, Kaplan cautioned that some organizations might be scared off by the price of the software — which starts at $50,000 for an Intel-based SCO Unix server license and $2,000 for a client license.

Client/server service center


1. Manager receives service request from customer.
2. Customer calls up server-based copy of service contract.
3. RTS Software checks to see if needed parts are in stock.
4. Repair job is scheduled, and worker is dispatched.
Database and Contract First server

GRAPHIC BY TERRI MITCHELL

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*Circle Reader Service #***28**

ELECTRONIC COMMERCE

For Web to gain success, it may have to change

BY ADAM GAFFIN

Washington, D.C.

The World-Wide Web may be Doomed, one industry analyst said last week.

Joshua Harris, president of Jupiter Communications, Inc. of New York, said at the Internet World show here that although the client/server-based Web is popular among existing Internet users, it still remains far from being a mass-market product.

Simply putting information, such as magazine articles, on-line will not attract most consumers.

Harris predicted that the Web will only attract the mass market when it becomes home to interactive games. He pointed to Doom, a popular networked game from Id Software, Inc. as an example of the type of application that needs to be ported to the Web.

"People don't read for eight hours a day," Harris said. But they do have their televisions on for that long, he said, adding that he expects to see such applications on the Web within three years.

MICROPAYMENTS

Robert Metcalfe, the Ethernet developer and, until recently, publisher of *InfoWorld,* forecasted a brighter future for publishers but said they will not be successful on-line until Internet providers deliver systems for "micropayment."

This would be a mechanism that allows an end user to call up articles and then automatically be billed a small fee.

Several vendors are working on such software for the Web, a distributed network of information servers to which end users connect via browser clients and hyperlinks.

Metcalfe added that, ultimately, advertising will play a major role in supporting on-line publications because users are unlikely to want to pay the full cost of supporting a publication through subscription fees.

Today, newspaper readers have their subscriptions heavily subsidized via advertising income.

Metcalfe predicted that "in your face" advertising, the kind now found in newspapers and magazines, will become acceptable once users can quickly clear ads from their screens — just as they can now turn the page on a newspaper ad.

This was the failing of Prodigy Services Co.'s on-line advertising — the system was so slow that users could not get rid of ads they were not interested in fast enough, Metcalfe said.

Sun Microsystems Computer Corp. is finding on-line publishing a way to cut costs, said Jerry Neece, senior product manager for networking product strategy.

Earlier this year, the company put technical data and answers to frequently asked Sun questions on public Web servers.

These documents have proven so popular that the company is now looking at annual savings of more than $3 million by being able to reassign technicians who once had to answer customer questions on the phone.

EDITORIAL INSIGHTS

Chargeback's high price

One static principle is that the better the network services you provide, the faster demand for them will grow. That's particularly true as we marry networks and applications to help people collaborate in new ways within and across companies.

Increasing demand is great for your visibility and job security, but your budget and staff never grow fast enough to keep up. As a result, many network departments are turning to chargeback mechanisms that make business units pay for the services they're using.

Chargeback can foster more intelligent use of services by making users learn that the network actually costs money, and it ensures that you're not the only one going back to corporate asking for more cash. But there is a danger associated with chargeback: It can have a chilling effect on usage of new technologies and could actually undermine your investments in them.

You may be forcing users to focus on the cost of the new service, such as videoconferencing, before they've even figured out what to do with it. Chargeback tends to discourage experimentation, which is exactly what's needed to discover innovative uses of technology.

I met last week with a network executive from a manufacturing company who's in just such a quandary. His department is in a catch-22 situation because it is forced to charge back for video services: Usage is low because the current per-hour charge is high. But that charge won't drop until usage grows. ("That's some catch, that catch-22," Yossarian said.)

The network manager — a real advocate of videoconferencing — is trying hard to sell the power of video to different departments and dream up ways it could help them. The sad truth is that he can't possibly do that as well as the departments themselves, if they were encouraged to explore the technology. So what's the right approach?

Through the strategic planning process, companies should identify new technologies that could help the business and fund their use for a period of time during which departments can trial them and discover applications with a real payback. Once usage grows to a certain level — more important, once users understand the value of the technology — the service can be brought under a chargeback scheme. That should probably be done in a phased manner to avoid any sticker shock.

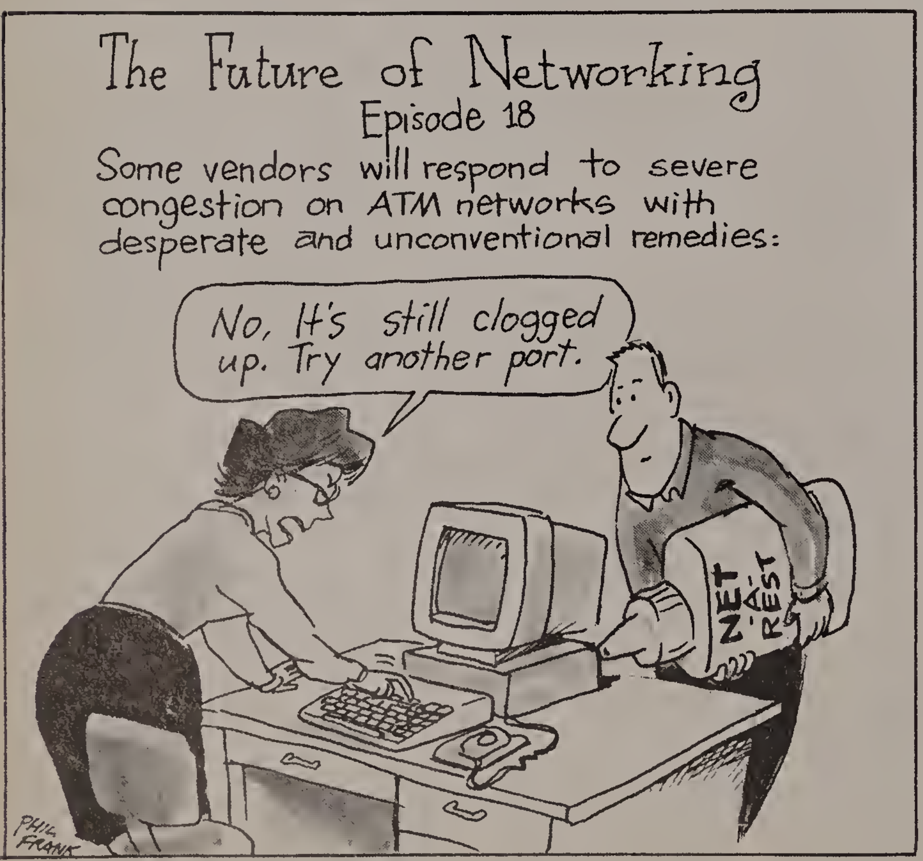
Chargeback is a useful tool, but it shouldn't be a straitjacket. You have to balance the need to share funding with the need for experimentation and innovation.

Let me know if you've found a way to strike that balance.

➾JOHN GALLANT jgallant@world.std.com

TELETOONS

FRANK AND TROISE


The Future of Networking
Episode 18
Some vendors will respond to severe congestion on ATM networks with desperate and unconventional remedies:
No, It's still clogged up. Try another port.
NET-A-REST
PHIL FRANK

MACROSCOPE

by James Kobielus

Firewalls aren't foolproof cure for Internet security woes

Some network managers seem to be embracing Internet security firewalls as a magic-bullet solution to a very complex problem. But if you think that by simply installing firewalls you can make your network completely hacker-proof, you're in for a cold dose of reality.

Firewall products include filtering routers, circuit-level gateways and application-level gateways. Their purpose is to keep casual 'Net users away from precious company data, limit legitimate users to selected applications and databases, let net administrators monitor outbound communications, and produce a detailed audit trail of all successful and attempted logons. But they are not bulletproof solutions.

There are no quick, permanent fixes that will ensure lasting net security in the age of ubiquitous internetworking. Your only hope for adequate protection is to stay tuned to the community of 'Net security professionals, seek and offer advice, and promptly apply the latest security techniques when appropriate.

Firewalls are doomed to fail as catch-all security solutions on most corporate nets. If your network is typical, it probably resembles a slab of Swiss cheese — with security holes through and through. Vast armies of hackers are poised like ants to enter through the tiniest opening, aided and abetted by the ignorance, negligence or duplicity of network insiders.

For a comprehensive technical discussion of firewalls, I urge you to check out William Cheswick and Steven Bellovin's book, *Firewalls and Internet Security: Repelling the Wily Hacker* (Addison-Wesley Publishing Co., 1994). As Cheswick and Bellovin point out, firewalls may deter only the most casual would-be hackers. More determined hackers will seek out the time-honored "back door" holes in network security: pilfered passwords, unprotected modem lines and operating system vulnerabilities.

Once a hacker has gained a foothold in your net, it's that much easier for him or her to fan out and wreak havoc on adjacent nodes that have been set up to implicitly trust the compromised hardware or software element. Hackers can break into remote computers with lightning speed and compromise hundreds or thousands of systems and subnetworks in no time. Call this the domino theory of network security.

Telecommunications security professionals should share their expertise at least as well as the on-line marauders who would flout it — a truth driven home by this year's well-orchestrated Internet Trojan horse, which compromised tens of thousands of 'Net computer accounts worldwide. Collective threats must be addressed via distributed action.

The growing corporate attention to firewalls is the flip side of today's bull market for all things related to the Internet. Corporate network managers have long had mixed feelings about the Internet — and not without some justification. One of their core responsibilities is protecting corporate assets against loss, theft and destruction by industrial spies, vandals and other unsavory elements.

They have traditionally regarded the Internet community, with its cultural emphasis on collegial information sharing, as offering a safe haven to mangy keyboard jockeys who have minimal respect for others' intellectual property.

The increasing prevalence of firewalls also reflects mounting popular disenchantment with the Internet. You can notice an Internet backlash in the press' increased attention to hacker culture, digital pornography, network terrorists, flame mail, viruses, copyright violations, privacy invasions and other unpleasant consequences of life on-line. You can also notice it in the increasing number of on-liners who are unable to find time to read — much less respond to — their E-mail backlogs. Even rocker Billy Idol, who fancied himself a cyberpunk and put his Internet address on his latest album, had to pull himself off-line when the E-mail glut got just a bit too intense.

Nevertheless, even the most hidebound network managers are having to accommodate the Internet boom, partly because many users are demanding access to that sexy new cloud. Many companies are experimenting with World-Wide Web, Gopher, Mosaic and other information-sharing tools that originated on the Internet. For companies, there's really no turning back from the Internet once they have established basic connectivity.

To ensure that your company has access to the latest Internet security tips, you should subscribe to security advisories published by the Computer Emergency Response Team (CERT). CERT is sponsored by the Defense Advanced Research Projects Agency, which spawned Internet ancestor ARPANet in the late 1960s and obviously feels a lingering responsibility to the on-line community. CERT advisories are available through Internet mailing lists (cert-advisory-request@cert.org), anonymous FTP [cert.org (192.88.209.5), /pub/cert—advisories] and Usenet (comp.security.announce).

Another good resource for anybody who cares about network security is CERT's 1991 pamphlet, "Guidelines for the Secure Operation of the Internet" (RFC 1281). It focuses on the shared responsibility of all networked organizations and users (especially the value-added networks and operating system vendors that supply our infrastructure) to ensure collective security, rather than rattle off a list of technological fixes and stopgaps.

You may also want to establish informal self-protective antihacker alliances with net managers in other firms. Until the proverbial townsfolk can colonize the electronic frontier, we may have to resort to posse justice to neutralize errant individuals. One example of a self-protective maneuver is the increasing propensity of Internet bulletin board system users to retaliate on-line against jokers who launch junk E-mail spam attacks.

Ideally, we shouldn't have to resort to vigilante techniques to enforce Internet security, but such is life on the frontier. Most of the Internet horror stories are true, but some of us prefer to live out here anyway.

➾Kobielus, a contributing editor to *Network World*, is a senior telecommunications analyst with DynCorp, a Reston, Va. based systems integration and professional services firm. He can be reached at (703) 461-2367 or via the Internet at kobielj@usva8.dyncorp.com. The opinions expressed are his own.

USER FORUM

by Ben Rothke

Separating CNE hype from reality

A lot has been written recently about the value, or lack of it, of Novell, Inc.'s Certified NetWare Engineer (CNE) program. Opinions run from those who call the CNE program pure hype, to those who view it as an important part of an individual's professional career in networking. Rather then enter that debate, I'd like to focus on what Novell provides — or doesn't provide — its CNEs with once they have entered the honored ranks of CNE-hood.

Considering the trouble people go through to become CNEs, one would expect Novell would give them the utmost respect, consideration and value due to their technical superiority and value to the company. As key players in NetWare support, CNEs would be expected to have an intimate relationship with Novell's technical support department. The perception in the industry is that Novell aspires to create an environment where, when a person has a complicated NetWare problem, he or she is told: "I don't know the answer; go ask a CNE."

My experience and that of others I know is that, in truth, Novell provides little support to CNEs and does not cultivate relationships with them. Besides getting a certificate to frame, I have found that a CNE certification does not enhance one's professional expertise.

I have been a CNE for nearly three years. After I took my last CNE test, I received a Welcome Aboard Kit from Novell. That is the last I have heard from the company. Except for receiving a postcard last year, I have gotten no indication that Novell knew I existed.

I directly contributed more than $6,000 to Novell's bottom line through educational courses and CNE tests, and all I have to show for it is what is in my Welcome Aboard Kit. All I want is a little respect or support from Novell.

Let me cite a few examples of Novell's deficiencies in its responsibilities to the CNE populace.

Within the past two years, Novell has introduced NetWare 3.12 and 4.X, killed the NetWare 2.2 product line, developed Virtual Loadable Modules and Application Loadable Modules, changed its chief executive officers, acquired Unix System Laboratories, Inc., developed UnixWare and forged a powerful relationship with Oracle Corp. If I had relied on Novell for that information, I would still be in the dark. Instead, I have to rely on the trade press for crucial networking information about Novell. In my tenure as a CNE, I have yet to receive from Novell a single press release or new product guide. So much for my CNE certification.

One area where Novell provides superb support is within the NetWire forum on CompuServe. Answers to difficult problems are often answered within the hour and usually within 24 hours. While NetWire is open to everyone, you would expect a CNE to get a sizable discount for on-line time. The discount: nuthin', honey.

Novell also produces a monthly journal called *NetWare Application Notes*, which contains a wealth of helpful technical information. It costs $95 per year. So how much is the CNE discount? Same as the NetWire discount — zippo. But if you join the Network Professional Association at $150 per year, you can get a subscription to the journal for $50. What a deal.

If you're a CNE who wants to purchase any of Novell's software to test or evaluate, to enhance your technical skills or to just play with, forget about buying it unless you want to pay the full retail price. Do you want to learn how to use NetWare 4.X (which Novell is staking its future on)? How about UnixWare? Feel free to go to any Novell-authorized training center, but don't expect any discount.

Do you want the software and manuals? Go to Egghead Software, not Novell. Those CNEs who are motivated to learn and tinker with new Novell software should not expect Novell to support them in their endeavors.

As for Novell organizations, membership in NetWare Users International (NUI) is free, as is "NetWare Connection," the NUI newsletter. You don't even have to use NetWare or be a CNE to become an NUI member or get a subscription to its newsletter.

So why would a networking professional want to become a CNE? The truth is, there is really no good reason. In my visits to Wall Street firms and similar organizations, I have found that most serious networking professionals are not interested in becoming CNEs.

My guess is that at least 80% of those who are pursuing the certification are the least experienced. Most networking professionals are better off spending the nearly $600 the CNE tests cost (seven tests at $85 each) on books or products. Unless you just have to have a CNE certificate on your wall, why shell out the money? I have found the CNE program to have an insignificant return on investment.

My point is not to shoot arrows at the CNE program; rather, it is to clear the air about what CNE certification is and, more importantly, is not. The CNE program was started with lofty intents and designs. Unfortunately, to quote the song, somehow it got wasted on the way.

➡ Rothke is a network manager at Track Data Corp., a New York-based market data vendor. He can be reached on the Internet at ber@tdc.com.

Needed video application

Regarding your editorial about the lack of applications for desktop videoconferencing in today's workplace (Oct. 17, page 50):

While few requirements for desktop videoconferencing may exist within today's office environment, there is currently an ideal market for an advanced form of this technology: communications with deaf persons. American Sign Language (ASL) cannot be transmitted accurately over compressed digital video links. Full-motion video is required to convey the nuances of ASL over videoconferencing links.

Simple arithmetic shows that even using a windowed application occupying one-eighth of a 640-by-480 pixel VDT, a single Ethernet barely provides the bandwidth required to carry a two-way ASL conversation.

Some combination of switched 10M bit/sec drops and a high-speed backbone would be required to duplicate the capabilities of a voice network (telephone switch) within a deaf campus or office environment.

My company is currently working with the Texas School for the Deaf in Austin to provide and install campuswide voice, video distribution and data networking systems.

I have discussed with the school's executive director his desire to implement a point-to-point, multiple-circuit, real-time videoconferencing network to allow deaf students to "converse" between dormitories, much as hearing teenagers use telephones to chat.

Although I have been unable to locate any system that provides this function at this time, my research has led to several interesting discussions with companies developing desktop videoconferencing equipment, and has, I hope, stirred some interest in the networking community to investigate the requirements of the deaf.

I hope your lack of enthusiasm for office applications of this technology does not indicate a slowing of development or research into these applications.

If any of your readers have researched this type of system, I would be extremely interested in comparing notes or discussing applications.

I can be reached via the Internet at bhawk@io.com.

Bill Hawk
Senior telecommunications engineer
JanCom Engineering Co.
Austin, Texas

Striking a balance

After having reread Linda Musthaler's column "NetWare for PowerPC gives users a choice, but little else" (Sept. 19, page 54) and letter to the editor from Peter Martin, who thinks Ms. Musthaler had been unfairly critical of the product (Oct. 17, page 52), I'd like to try to strike a balanced tone between these two.

It's important to realize this is no longer an Intel Corp.- or Microsoft Corp.-only world. The enterprise is, at best, a mixed bag of cashews, peanuts and walnuts. This being the case, any variety on the server scene is welcome and is a boon to any NetWare administrator. Think about the folks having to tweak non-Intel based clients from a DOS-only server. Now that's suffering.

But that's sort of the argument here. In short, Ms. Musthaler believes that the bulk of *NW* readers

See In-box, *page* 52

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Network World
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Phone: (508) 875-6400; Fax: (508) 820-3467
MCI Mail - 390-4868
Internet: networkworld.std.com.
Washington, D.C. Bureau
National Place
1331 Pennsylvania Ave. NW, Suite 505
Washington, D.C. 20004
For more details on how to reach us, see page 86.

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Colin Ungaro, President/Publisher
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Help desk

Continued from page 2

groups are really addressed. You should also look at Network General Corp.'s Foundation Manager, HP's HP OpenView, IBM's NetView 6000 and SynOptics Communications, Inc.'s Optivity.

NW contacted an HP spokeswoman who said NetMetrix consists of several key applications, including an internetwork monitor, load monitor, protocol analyzer, Network File System monitor, traffic generator and enterprise utilities.

Pricing depends on the applications mix or package bundle chosen; prices range from $1,005 to $12,695. For more information, contact HP at (603) 888-7000.

I'm thinking about implementing a LAN with Internet connectivity using an existing closed circuit television cabling plant in a university environment. Who are the providers of modems, routers and other equipment that make it possible to transmit LAN data over closed circuit television cable?

Slawomir Lobodzinski,
Long Beach, Calif.

Robert Cruickshank, project manager for telecommunications projects at Cable Television Laboratories, Inc., the research and development lab for the cable TV industry in Louisville, Colo., responds:

Funny you should ask. We are looking for the same type of equipment. In fact, we issued a request for proposal to vendors last July and are currently going over responses. While we are not at liberty to disclose everything vendors have told us, there is great interest in building such products.

Currently, only a handful of vendors have something on the market. LANcity Corp. of Andover, Mass., has developed an Ethernet bridge that provides 10M bit/sec of throughput over standard 6-MHz cable channels that stretch as far as 160 miles. Digital Equipment Corp. resells the bridge. Cisco Systems, Inc. is also working with LANcity and demonstrated a router that will make it possible to use CATV backbones to interconnect LANs and WANs at the Western Cable Show in Anaheim, Calif., two weeks ago.

Zenith Electronics Corp. also offers its HomeWorks product, which enables users to send Ethernet data at 4M bit/sec over CATV systems. Published reports indicate Intel Corp. is working with General Instrument Corp. to develop a product for sending 10M bit/sec Ethernet traffic over CATV systems.

HELP DESK UPDATE

Alison Conliffe will be riding herd over the Help Desk for a short period while Dana Thorat takes a leave of absence from *NW*. Readers can submit questions to Conliffe via phone at (800) 622-1108, via fax at (508) 820-1103, via the Internet at aconliff@world.std.com or via CompuServe at 75471,2725.

In-box

Continued from page 51

are Intel-based and are not prone to picking up anything from Apple Computer, Inc. But what about the firms with thousands of Macintoshes? Surely they read *NW*, too. Mr. Martin underlines the need for fairness when addressing mixed platforms and software "still in the oven."

Yet the reality is that NetWare running native on PowerPC is a good thing for current administrators for several reasons.

Platform-specific flavors will help influence additional flavors, which will help keep innovation alive. And since the Macintosh is a mature and high-volume installed base, as it is incorporated into existing non-Apple configurations, network administrators will have a savvy version of NetWare to tweak Macintosh clients, which is a good thing.

In addition, having more users (via more platforms) results in more feedback to the folks at Novell, Inc., which can only improve the future design and feature set of NetWare. Users with Macintosh-only or Macintosh-dominated LANs and WANs would welcome native NetWare. Finally, as the Macintosh operating system goes completely native on PowerPC, application performance will increase, and the draw to PowerPC will continue; this is the current trend. Don't forget about AIX and Windows NT on PowerPC. This movement can allow Novell to exploit (relatively) new CPU technology and deliver the next generation of NetWare — optimized for PowerPC and its super built-in CPU.

NetWare on PowerPC won't be radically different in terms of its graphical user interface than its Windows cousin, and it can only help the enterprise at large. It's OK to go for PowerPC-native NetWare. Look again.

Mark Ware
Site software analyst
Data Systems Analysts, Inc.
Dallas

Musthaler's response: I certainly agree with Mr. Ware's point that a strong operating system like NetWare on the PowerPC platform will help make the new CPU technology a stronger player in the chip market. I also agree wholeheartedly with his comment that such maneuvers by Novell help to keep innovation alive.

I certainly favor choice, and I do recognize that in this industry, one size (or make that flavor) does not fit all. The point of my original column, however, was that many (not all) NW readers won't see much of an immediate benefit from this new platform. That doesn't mean that no one will benefit. I do point out that the market targeted by both Novell and Apple should welcome the new product offering with open arms.

Small wonder

In your User Excellence Awards piece on Iowa (Nov. 21, page 64), Phil Smith, director of the Iowa office for state and federal relations, says "[carrier] services are simply not available, because there is no business case for the telephone companies" to provide high-capacity fiber links into sparsely populated areas.

You may be interested to hear that tiny Nicholville Telephone Company (NTC), in rural Nicholville, N.Y., is the proud possessor of 23 miles of fiber. Nearly a century old, the carrier was one of the first telephone companies to serve New York's "North Country."

The fiber run connects NTC's remote switches. Housed in a small concrete hut, these switches carry traffic between the local copper distribution and the fiber. NTC has six or seven of these switches, serving 2,100 subscribers spread out over 217 square miles.

Sounds to me like Mr. Smith needs a few NTCs in Iowa.

Russell Nelson
President
Crynwr Software
Potsdam, N.Y.

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Buyer's Guide

Modularity eases the imaging purchase

Vendors break from the complete proprietary solution to more open software components that can run over existing LAN hardware.

Imaging products finally seem to be coming within reach for many buyers as vendors continue to pull apart proprietary systems into more modular components that run across a variety of common platforms and LAN environments.

Today, imaging vendors are rolling out modular software for scanning, storing, viewing and distributing images. That means you can acquire only the functions you need or opt to buy the whole shebang from one or more vendors. What's more, the modules have many application program interfaces (API) and links to other products, which paves the way for better integration of imaging services with mainstream business applications.

The onslaught of modular software is welcome news to users looking to layer imaging on top of existing environments that utilize commodity products. This modular approach enables users to tap such common third-party components as scanners, printers, database management systems and storage systems to support imaging. A workflow module that makes it possible to automate how images are routed around the network gives users even more for their money.

The shift to modular software is quickly putting an end to the days when buying a single package that bundled everything from viewing stations to workflow from one vendor was the only option.

Users can now buy the image viewing software from one vendor, workflow software from another and an image management or DBMS component from yet a third vendor. Of course, many vendors still bundle components together to provide a complete system.

Imaging software vendors are also rolling out support for de facto standards such as Microsoft Corp.'s OLE and Dynamic Data Exchange (DDE). These standards make it possible to easily add imaging services to everyday office automation tools such as word processing, databases and spreadsheets.

Spalding Sports Worldwide in Chicopee, Mass., is just one of many companies benefiting from modular imaging. The company tapped Keyfile Corp.'s Keyfile to eliminate the need to print specification books that contained pictures and text descriptions of products. Workers now have access to an OS/2-based server that downloads images of specification book pages to Windows-based personal computers.

By LINDA MUSTHALER

The ability to utilize inexpensive Windows PCs and an existing Novell, Inc. NetWare LAN was a driving force in attracting the company to imaging. Years ago, the firm examined imaging products that required proprietary hardware but considered them too expensive. The lower cost Windows-based product running on existing PCs now saves the company the high cost of printing and distributing books.

But choosing an imaging product solely on its ability to run on existing equipment can be a giant gamble. Net managers should instead pay more attention to examining the strength of each product's DBMS capabilities, indexing method, storage management and support for Windows clients. The strength of those services will distinguish high-powered image processing systems capable of handling a steady stream of transactions from less powerful products that enable users to periodically tap into stored images.

Moreover, users may consider imaging tools that either already have embedded workflow features or work with an add-on workflow module. The combination of imaging and workflow can help users redefine how information flows and work gets done throughout a department or across the enterprise.

PORTRAIT OF A MARKET

There are many products, such as document management systems, that come bundled with some degree of imaging capabilities (*NW*, July 18, page 35). But true imaging systems let users scan images for storage on a server, classify them according to user-specified criteria and pull those images up on a workstation for viewing, modification or printing. These products also provide a way to route images around the network as well as distribute them via electronic mail or fax.

High-end products provide all of those functions plus a few additional ones, such as optical character recognition (OCR), content-based image retrieval and sophisticated image management. These products are suited for enterprisewide usage in a heterogeneous network environment geared to heavy-duty processing of incoming information.

Because of the complex nature of the high-end products, they are often sold as tool kits rather than shrink-wrapped products. The tool kit provides the user, or more likely a systems integrator, with everything needed to build custom imaging applications. Shrink-wrapped packages are preprogrammed to sup-

Continued on page 57

INSIDE

Buyer's Guide chart tells you who does what. 56

Four products earn The Short List recognition. 57

Vendors shoehorn image services into NOS and other operating systems. 61

Buyers should closely eyeball standards support. 62

Scanners and OCR gear complete the purchase. 64

Readers give the lowdown on product usage and important features. 64

Imaging systems

Company	Product	Distributed capabilities	Workflow			Operating system type: RAM (bytes)		Windows servers N = Windows NT W = Windows 3.1			Windows support	NOS	Database	Image formats	Development tools	Performance enhancers				Features			Price
		D = Detached database server M = Multiple database search S = Separate scan and OCR	A = Add-on E = E-mail-based M = Module	GUI-based	Document control	Client: D = DOS M = Macintosh OS = OS/2 U = Unix W = Windows O = Other	Server: D = DOS N = NetWare OS = OS/2 U = Unix W = Windows O = Other	Jukebox server	Database/indexing	OCR server	DC = DDE client DS = DDE server O1 = OLE 1.0 O2 = OLE 2.0 OD = ODBC	L = LAN Manager N = NetWare T = TCP/IP V = VINES O = Other	P = Proprietary T = Third party	J = JPEG P = PCX T = TIFF O = Other	P = PowerBuilder V = Visual Basic O = Other	Staging	Prefetching	LRU algorithm	User-configurable	Batch scanning	COLD	Print by reference	C = Client S = Server/No. of users T = Total average system cost for imaging hardware, software and integration/ No. of users
Compulink Management Center, Inc. (310) 212-5465	LaserFiche NLM/Windows	D, S	A		✔	W: 8M	N: 8M (1)		W		DC (2)	N	T	P, T, O	P, V					✔	✔		C: $295 S: $13,290/10 T: $30,000/10 (3)
Data General Corp. (800) 328-2436	AV Image	D, S	A	✔	✔	W: 8M	U: 32M		W		DC, DS	T	T	P, T	V	✔	✔	✔	✔	✔			C: $695 S: $3,995/5 T: $27,000/5
Excalibur Technologies Corp. (800) 788-7758	Excalibur Electronic Filing System	D, M, S	A, E, M		✔	M: 1M W: 4M	U: 16M O: 32M				DC, DS	L, N, T, O	P, T		V			✔	✔	✔			C: NA S: $6,000/5 T: $50,000-$75,000/10
FileNet Corp. (800) 345-3638	WorkFlo Business System	D, M, S	M		✔	OS: 8M W: 10M	U: 64K				DC, DS, O2	L, N, T, V	T	J, T	P, V	✔	✔	✔	✔	✔	✔	✔	C: $795 S: $36,000/4 T: NA
Highland Technologies, Inc. (301) 345-8200	HighView	D, M, S	M	✔	✔	W: 8M	N: 32M OS: 32M U: 32M		N, W	N, W	DC, DS, OD	L, N, T, V, O	T	J, P, T, O	P, V	✔	✔	✔	✔	✔	✔	✔	C: NA S: $5,500-$12,500/1-6 T: $60,000/6
IBM (800) 426-2255	ImagePlus	D, M, S	M	✔	✔	OS: 12M-16M	OS: 16M-32M O: (4)					L, N, O	T	J, T, O		✔	✔	✔		✔	✔	✔	C: $395 S: $24.95/1-7,000 T: $35,000/10
Identitech, Inc. (407) 951-9503	FYI Document Management & Workflow System	D, M, S	M	✔	✔	OS: 8M W: 4M-8M	D: 16M OS: 16M U: 32M W: 16M	W	N, W	W	DC, DS	L, N, T, V, O	T	J, P, T, O	P, V, O	✔	✔		✔	✔	✔	✔	C: NA S: NA T: $60,000/25
ImageFast Software Systems, Inc. (800) 889-6665	ImageFast 3.0	D, M, S	M	✔	✔	W: 4M	D: 1M OS: 6M U: 12M W: 8M	N, W	N, W	N, W	DS	L, N, T, V	T	P, T, O	V				✔	✔		✔	C: $500 S: $2,500/100 T: NA
Image-X International (805) 964-3535	Image-X Document Imaging and Computer Output Storage System	D, M, S	M	✔	✔	D: 4M OS: 4M U: 4M W: 4M	OS: 32M U: 32M W: 16M	W	N, W	W	DC, DS, OD	N, T, V	T	J, P, T	P, V	✔	✔		✔	✔	✔	✔	C: $299 S: $800/5 T: $30,000/10
Imagination Software, Inc. (301) 588-8411	Imagine	D, M, S	A, M	✔	✔	W: 4M	W: 4M		W	W	DC, DS, OD	L, N, T, V	P, T	J, P, T, O	P, V, O	✔			✔	✔		✔	C: $695 S: $1,695/NA T: $5,000/20
Keyfile Corp. (603) 883-3800	Keyfile 2.3	D, M, S	M	✔	✔	W: 6M O: 6M	OS: 8M U: 32M W: 8M	W	W	W	DC, DS, O1, OD	L, N, T, V, O	P	J, T	P, V, O	✔	✔	✔	✔	✔	✔	✔	C: $596-$795 S: $7,995-$11,995/NA T: $1,000/1
LaserData, Inc. (508) 649-4600	DocuData	D, M, S				W: 8M	O: 12M				DC, DS, OD	N	T	T, O	P, V					✔		✔	C: $495 S: $12,500/10 T: $17,450/10
	DocuFlow	D	A	✔	✔	W: 8M	OS: 12M				DC, DS	N	NA			✔							C: $129.5 S: $8,000/10 T: NA
	LaserView for Windows	S				W: 3M	NA				DC, DS	N, O	NA	T, O	O					✔		✔	C: $200 S: NA T: $2,000/10
	Optical Storage for NetWare	D, M				W: 8M	O: 12M					N	NA			✔	✔	✔	✔				C: NA S: $4,475-$29,850/NA T: $4,475/10
Lenel Systems, Inc. (716) 248-9720	MpcOrganizer	M	E			W: 8M	W: 8M		W		DS, O1	L, N, O	P, T	J, P, T, O	P, V, O								C: $149 S: NA T: NA
Lotus Development Corp. (617) 577-8500	Lotus Notes: Document Imaging 2.5	D, S	E	✔	✔	W: 6M	OS: 12M				DC, DS, O1	N, T, V, O	P	P, T, O				✔					C: $99 S: $3,000/NA T: NA
Network Imaging Systems Corp. (703) 478-2260	1View 1.0	D, M, S	M	✔	✔	W: 16M	U: 32M			W	DC, OD	T	T	J, P, T, O	P, V, O	✔	✔	✔	✔	✔	✔	✔	C: $495 S: $17,800/NA T: $94,000/50
Optika Imaging Systems, Inc. (719) 548-9800	File Power Multi Document Management System	D, S	M	✔	✔	W: 8M	W: 4M	N, W	N	N, W	DC, DS	L, N, V, O	T	J, P, T, O	P, V, O	✔	✔	✔	✔	✔	✔	✔	C: $600-$1,200 S: NA T: NA
	PowerFlow-Work Management System	D, M, S	M	✔	✔	W: 8M	W: 8M	W	N		DC, DS	L, N, V	T	J, P, T, O			✔	✔		✔	✔	✔	C: $700-$1,600 S: NA T: NA
PaperWise, Inc. (801) 261-8850	ImageWise	D, M, S	A, E, M	✔	✔	W: 8M	N: 8M		N, W		DC, DS	N	P	P, T, O	V	✔	✔	✔	✔	✔	✔	✔	C: $1,995 S: $14,995/20 T: $11,500-$45,000/10-100
Recognition International, Inc. (408) 747-1210	Plexus Extended Data Processing	D, M, S	A	✔	✔	M: 8M U: 8M W: 8M	U: 12M				DC, DS, O1	N, T	T	T	O	✔	✔	✔		✔	✔		(5)
Sigma Imaging Systems, Inc. (212) 476-3000	OmniDesk	D, S	M	✔	✔	OS: 8M W: 8M	OS: 32M				DC, OD	L, N, V, O	T	T	P, V, O	✔	✔	✔	✔	✔		✔	C: NA S: $3,000/1 T: NA
Simplify Development Corp. (603) 881-4450	MailRoom for Windows	D, S	E		✔	W: 4M	N: 16M					N	T	T			✔	✔	✔	✔			C: $129 S: $1,000/NA T: $32,900/100
	MailRoom Client/Server	D, M, S	E		✔	W: 4M	N: 16M					N	P	T			✔	✔	✔	✔			C: $129 S: $1,000/NA T: $8,725/25

Imaging systems

Company	Product	Distributed capabilities	Workflow			Operating system type: RAM (bytes)		Windows servers N = Windows NT W = Windows 3.1			Windows support	NOS	Database	Image formats	Development tools	Performance enhancers				Features			Price
		D = Detached database server M = Multiple database search S = Separate scan and OCR	A = Add-on E = E-mail-based M = Module	GUI-based	Document control	Client: D = DOS M = Macintosh OS = OS/2 U = Unix W = Windows O = Other	Server: D = DOS N = NetWare OS = OS/2 U = Unix W = Windows O = Other	Jukebox server	Database/indexing	OCR server	DC = DDE client DS = DDE server O1 = OLE 1.0 O2 = OLE 2.0 OD = ODBC	L = LAN Manager N = NetWare T = TCP/IP V = VINES O = Other	P = Proprietary T = Third party	J = JPEG P = PCX T = TIFF O = Other	P = PowerBuilder V = Visual Basic O = Other	Staging	Prefetching	LRU algorithm	User-configurable	Batch scanning	COLD	Print by reference	C = Client S = Server/No. of users T = Total average system cost for imaging hardware, software and integration/ No. of users
Soda Creek Technologies, Inc. (510) 855-3900	SCT Filer	D, M, S	A		✔	W: 8M	N: 8M W: 8M	W	N, W	W	DC, DS, OD	L, N, T, V	T	T	P, V	✔				✔			C: NA S: $1,600/1 T: $40,000-$80,000/5-20
Wang Laboratories, Inc. (800) 229-2973	Open/Image	D, M, S	M	✔	✔	U: 4M W: 4M	N: 16M U: 64M			W	DC, DS, O1, O2	N, T	P, T	J, T	P, V	✔			✔	✔	✔	✔	C: $299 S: $2,480-$110,500/5-250 T: $592,000/40
Watermark Software, Inc. (617) 229-2600	Professional Edition	D, S	A		✔	W: 8M	W: 32M				DC, DS, O1, O2, OD	L, N, T	T	P, T, O	P, V	✔		✔	✔	✔			C: $295 S: $120/1 T: NA
Westbrook Technologies, Inc. (800) 949-3453	File Magic Plus 4 Series	D, M, S	E		✔	W: 8M	W: 8M	N, W	N, W		DS, O1	L, N, V, O	P	J, P, T, O	V, O	✔				✔	✔		C: NA S: $1,795-$3,750/1-10 T: $75,000/16

Products highlighted by color were selected for The Short List.

Chart compiled by Cheri Paquet

FOOTNOTES:
(1) In addition to NetWare requirements.
(2) Partially supported.
(3) Includes server and 10 clients.
(4) Depends on the selected IBM mainframe or minicomputer.
(5) Vendor did not supply information.

COLD = Computer Output to Laser Disk
DDE = Dynamic Data Exchange
GUI = Graphical user interface
JPEG = Joint Photographic Experts Group
LRU = Least recently used
NA = Not applicable
NOS = Network operating system
OCR = Optical carrier recognition
ODBC = Open Database Connectivity
OLE = Object Linking and Embedding
TIFF = Tagged Image File Format

Where the vendors fit into the market

High-end product vendors:

- FileNet
- Highland Technologies
- IBM
- Identitech
- ImageFast
- Image-X
- Imagination Software
- Keyfile
- Network Imaging Systems
- Optika Imaging Systems
- Recognition International
- Sigma Imaging Systems
- Wang

Mid-range product vendors:

- Compulink
- DG
- Excalibur
- LaserData
- PaperWise
- Simplify Development
- Watermark

Low-end product vendors:

- Lenel Systems
- Lotus
- Soda Creek
- Westbrook

Continued from page 55

port specific functions and are often difficult to change.

Many of the high-end products have roots in the traditional proprietary imaging world. Products such as FileNet Corp.'s WorkFlo Business System are becoming more open as they are redesigned for use in client/server nets. The vendors of these products recognize the need to support multiple DBMSs for indexing, workflow and E-mail standards, and interfaces to common productivity tools such as word processing.

Mid-range products provide a total, integrated imaging solution and can be deployed on a departmental or enterprisewide scale. Several mid-range products, such as Data General Corp.'s AV Image, LaserData, Inc.'s DocuData, PaperWise, Inc.'s ImageWise and Watermark Software, Inc.'s Professional Edition, have many of the advanced features of a high-end offering but run on a narrower range of operating systems.

Bringing up the rear of the market are products that can adequately meet the needs of small workgroups. They're often shrink-wrapped products that need little customization but can't quite match the other offerings when it comes to supporting heavy-duty processing.

SYSTEM ARCHITECTURE

There are four main elements of any imaging system: the core application that includes an integrated storage management system, which typically runs on a host or server; the client application or user interface, which runs on the desktop workstation; the index-and-search engine, which typically resides on a file or data-

Continued on page 59

Imaging systems

The Short List highlights products Network World *recommends you examine before purchasing imaging systems. Products on this Short List serve the needs of users with multivendor enterprise nets and offer individually unique attributes that set them apart from the others. Your criteria may differ.*

■ FileNet Corp.

WorkFlo Business System

As a venerable player in the imaging arena, FileNet is spreading many advanced features of its large, proprietary system into the client/server world. The WorkFlo Business System has many rich high-end features that enable it to support heavy-duty processing environments with the most serious workflow needs. The product has a batch scanning feature that speeds the process of scanning images into the database. It also has a Computer Output to Laser Disk feature that enables mainframe data to be stored in the image database in ASCII format. Other high-end features include prefetching and staging that speed image access and bar coding support.

Clients can operate under either OS/2 or Microsoft Corp. Windows, while servers can run an assortment of Unix flavors, including IBM's AIX and Hewlett-Packard Co.'s HP-UX. Several network operating systems are supported, including Banyan Systems, Inc.'s VINES, Microsoft's LAN Manager, Novell, Inc.'s NetWare and TCP/IP.

■ Recognition International, Inc.

Plexus Extended Data Processing (XDP)

Users requiring a product that can be highly customized will want to check out Plexus XDP. This product is a developer's dream, as many system components are totally programmable. In fact, value-added resellers often use Plexus XDP to build custom applications that penetrate many vertical markets. However, users selecting Plexus XDP should be prepared to spend lots of time with a systems integrator. Plexus FloWare software brings top-notch workflow capabilities into the picture.

Plexus XDP also supports a prolific list of platforms. Client workstations can run Microsoft's Windows, Apple Computer, Inc.'s Macintosh System 7 and five flavors of Unix. The server piece runs on the richest set of Unix platforms.

■ Watermark Software, Inc.

Professional Edition

Users with an extensive Windows environment will find Professional Edition and its add-on Image Server document management module offer the ultimate in component software: It makes imaging just one more weapon in their arsenal of productivity tools. Watermark boasts that it was the first image-enabling product fully compliant with the Windows Dynamic Data Exchange (DDE) and Object Linking and Embedding (OLE) 2.0 standards. DDE and OLE enable users to seamlessly integrate images from Professional Edition with other applications that run in the familiar, standard Windows-based environment.

Watermark supports the full range of Windows, Windows NT and Microsoft SQL Server products. Benchmark tests run at Compaq Computer Corp.'s laboratories indicate that Watermark delivers mainframe-class imaging performance at a fraction of the cost. Watermark products are often bundled with other vendors' electronic mail, workflow and groupware products, further demonstrating the strength of Watermark's core technology. The company provides products that give users an easy entry into imaging, with the ability to scale up to a full-blown production system if needed.

Honorable mention

■ Keyfile Corp.

Keyfile 2.3

Keyfile operates very well right out of the box at a relatively low entry price of about $1,000 per user. Although the product operates in enterprise nets that run VINES, LAN Manager, NetWare, TCP/IP, IBM's LAN Server and Digital Equipment Corp.'s Pathworks, there is a drawback: The product takes a document-centric approach to imaging. The normal mode of operations is to use the Keyfile interface to work with documents. In fact, Keyfile replaces the Windows Program Manager. This interface can be changed with some programming, however.

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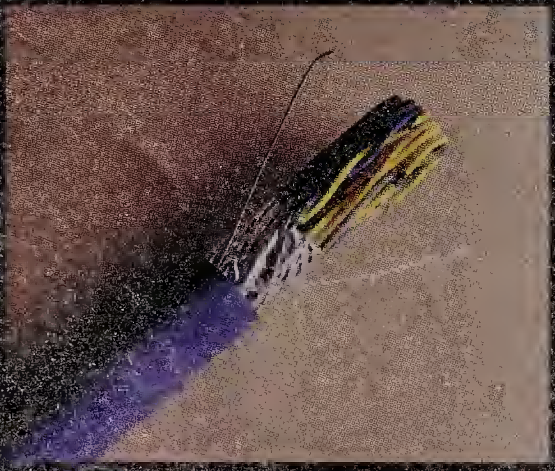

Belden

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Continued from page 57

base server; and the images themselves, which can be distributed virtually anywhere on the network.

The core application ties together the individual components for indexing, storing and distributing images. The desktop client piece is usually where the user scans, views and manipulates images. The index-and-search engine is usually a relational DBMS that tracks how images are classified and where they are stored. The images can be anything from photographs and complex digitized images of magazine pages to a child's crayon drawing or the lunch menu from a restaurant near the office.

Given the size of image files — often up to 40K to 60K bytes each even when compressed — most products support various storage options. First, there is an on-line central image repository also known as an image server and is typically a magnetic disk medium. Most products also support near-line storage, such as an optical jukebox or tape subsystem for longer term storage of images. The image server not only stores data for ready access, but also provides an interface for migrating images to less expensive, more permanent near-line storage devices.

This architecture is fairly common among all products. However, while imaging products share a common architecture, some are designed for heavy-duty production-oriented applications that operate according to a very structured workflow, while others support more casual access to images.

AppWare's few friends

Novell's AppWare is currently supported by only four of the 24 vendors surveyed: Compulink, Excalibur, Identitech and Image-X.

In a production-oriented application, hundreds or thousands of images are scanned and processed every day. The emphasis is on capturing large volumes of imaged information for action and ultimately permanent storage according to a prescheduled routine of work.

For example, an insurance claim processing application requires a production-oriented imaging system in order to routinely receive and process thousands of claims per day. The business process doesn't vary much. A clerk scans a claim document and forwards the resulting image to a claims processor who makes a judgment on payment. If the claim is approved, a check is cut and sent to the customer, and the image is stored for posterity.

Other products are designed to support more casual imaging applications. Users determine how and when an image enters the system, as well as how it is distributed and maintained on an ad hoc basis.

For instance, once a computer-aided design drawing of an automobile part is done, it can be indexed and stored in an imaging repository. A copy of the drawing — or more precisely, a pointer to where the image is stored — can be sent via E-mail to others. There is no set timetable for any of these actions. The user determines how the process proceeds.

That's not to say that production systems don't allow you to develop image processing and distribution rules on the fly. On the contrary, the better production systems allow for ad hoc decisions that can better utilize employee skills. Likewise, ad hoc systems may have formal process and workflow capabilities. However, these features aren't the mainstay of the imaging product.

Excalibur Technologies Corp.'s Excalibur Electronic Filing Systems (EFS), Lenel Systems, Inc.'s MpcOrganizer, Lotus Development Corp.'s Lotus Notes: Document Imaging 2.5 (LN:DI, pronounced "lindy") and Simplify Development Corp.'s MailRoom for Windows lack some of the tools needed to operate in a heavy-duty production environment but are suitable for ad hoc applications. The other products listed in the Buyer's Guide chart starting on page 56 work in both a production and an ad hoc environment.

As one would imagine, the workflow process is a very critical component of imaging systems used in production environments. Workflow for the ad hoc systems is much less formal and impromptu.

THE IMAGE STORE

Workflow and most other imaging services are only made possible if there is a way to maintain an image index in a proprietary or open relational DBMS.

In order to conserve storage space, products compress images into an unreadable bitmapped file. So users can't directly peruse images to select the ones they want to retrieve. Instead, someone has to manually classify the images according to attributes, such as name or subject matter. Those attributes then go into a database record.

To retrieve an image, users first query the database employing the appropriate attributes to learn where it is stored. They can then issue the commands needed to call it up on-screen.

Some imaging systems include an optional

Continued on page 61

IBM Communications Manager/2

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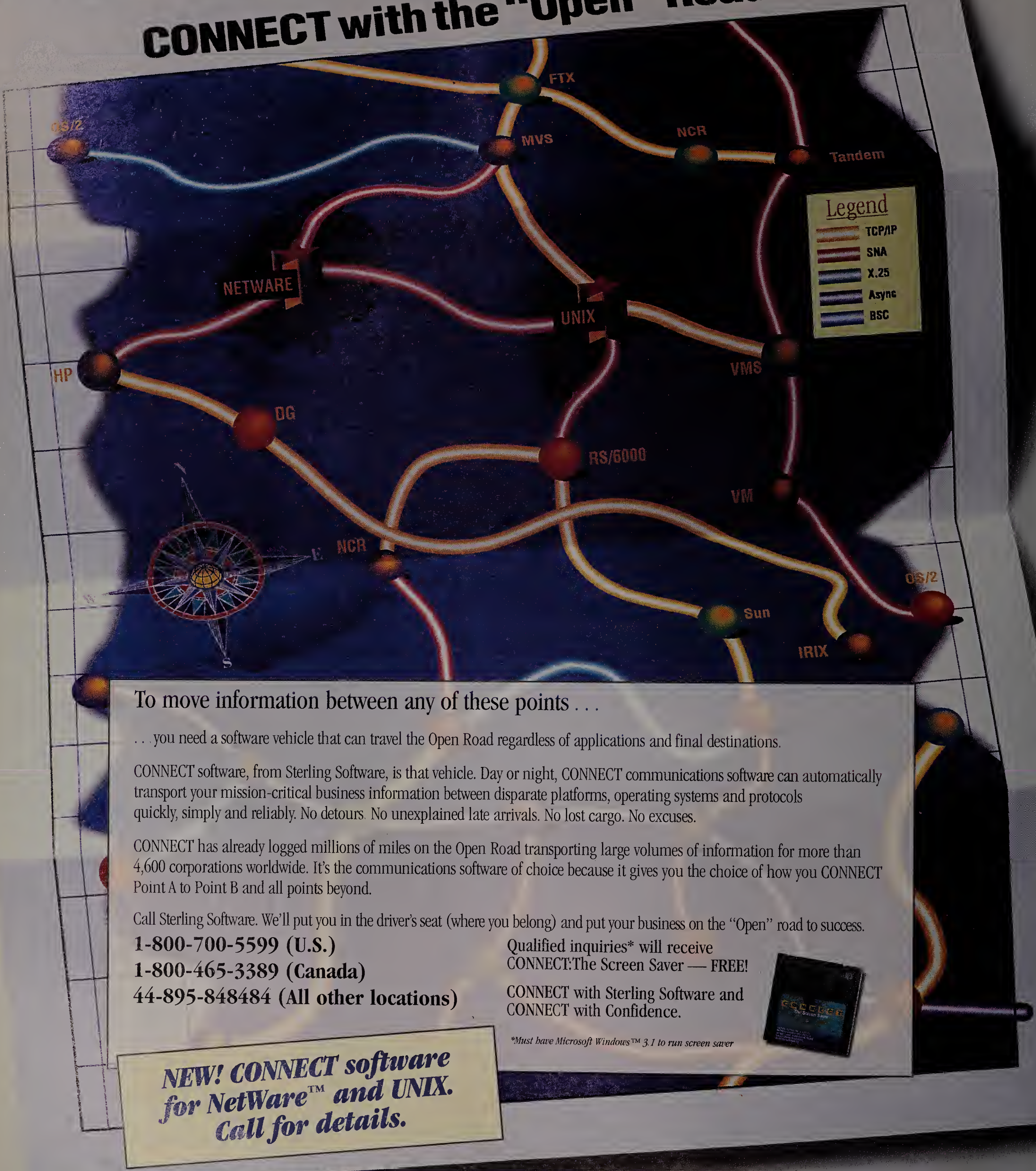

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Continued from page 59

OCR engine that turns the bitmapped image into readable text. Once in text format, the image can be indexed on its full text content. Thus, in the example of a medical form, users can search for images that contain words or phrases such as "recurring pain." Information about where images with the words recurring pain is retrieved, letting the users call up the appropriate image.

The OCR engine is most commonly supplied by a third-party vendor such as Calera Recognition Systems, Inc. in the form of software.

Excalibur's Excalibur EFS offers a unique indexing technology. The product uses the firm's Adaptive Pattern Recognition (APR) rather than key word attributes or full text content to index images. APR essentially reduces an image to dominant patterns at the pixel level. This technique makes EFS extremely accurate in matching patterns in images such as fingerprints, photographs and even nonimage data types such as audio clips.

APR even reduces text to its lowest common denominator — a series of shapes or patterns that comprise each character.

No matter how a product indexes its image files, these indexes are typically stored in a back-end DBMS that can be queried through standard SQL or via proprietary languages and commands. The most flexible products offer users a choice of DBMSs from such vendors as Oracle Corp. and Sybase, Inc.

The images themselves are also stored in a database that supports common image formats such as ones defined by the Joint Photographic Experts Group, as well as industry-standard PCX and the Tagged Image File Format.

Many imaging products that operate in the Windows environment adhere to Microsoft's Open Database Connectivity (ODBC) standard. ODBC makes it possible to access multiple DBMSs from a single Windows client or a single DBMS from a variety of clients. Highland Technologies, Inc., Image-X International, Imagination Software, Inc., Keyfile, Network Imaging Systems Corp., Sigma Imaging Systems, Inc., Soda Creek Technologies, Inc. and Watermark are among the vendors supporting ODBC. Excalibur, FileNet, Identitech, Inc., Optika Imaging Systems, Inc., PaperWise, Recognition International, Inc. and Wang Laboratories, Inc. plan to implement ODBC in the future.

The type of DBMS and indexing used has as much effect on image retrieval as it does on storage. To retrieve an image in a system that uses attributes, you simply specify lookup parameters. For instance, you might specify the author's name, the subject of the image and perhaps a key word or two. If the image has been run through a scanner with OCR, you can search for words within the context of the file. The DBMS determines what search capabilities can be used. Common options include direct matches, wild cards, Boolean logic and matches where a word sounds like it could be the key word if spoken.

With Excalibur's Excalibur EFS product, you can compare one image to another and look for the closest match of patterns. For instance, a police department could scan a new fingerprint and tell the search engine to look for stored images with similar patterns. Those images that have the exact or approximate patterns are retrieved. You can set the level of sensitivity for pattern matches.

STORAGE MANAGEMENT

Managing how and where images are stored is a very important element of any imaging system. It has to do with how, where and when files are permanently stored, archived and backed up. It would be nice if every image could be stored permanently on a hard disk or a networked image server. But the reality is that the on-line storage provided by disk drives gets eaten up quickly and is relatively expensive. Chances are, you will require a near-line and off-line storage to complement the on-line devices.

Near-line storage usually refers to optical storage systems that squirrel images away on compact disk-like platters. Images kept in near-line storage are readily available but at a slower retrieval rate than with a magnetic disk. Large-volume systems usually require banks of optical disks, called jukeboxes.

NLM support

Vendors that offer database and indexing retrieval NLMs include:

- Compulink
- Highland Technologies
- Identitech
- Image-X
- LaserData
- Simplify Development
- Wang

Off-line storage refers to magnetic tape. Once your files are placed on tape, they are generally unavailable without some human intervention. For instance, unless the tape subsystem comes with an autochanger, someone has to manually load the tape with the required image into a drive and move that image to another form of storage. Tape is usually reserved for the permanent long-term storage of images as well as for daily backups.

A lot of imaging products include a least recently used (LRU) algorithm that automatically migrates images that haven't been accessed within a specified time period from short-term storage to long-term.

Where and how frequently used images are stored may have a significant impact on performance. Some users prefer to store all images on a central image server. While this approach makes administration easier and access quick, it also creates more network traffic than necessary, especially if everyone accesses the same resource to store-and-retrieve images.

Some firms choose to deploy local image servers to help reduce net traffic. There is no cut-and-dry rule for the number of image servers to deploy. You simply have to look at your own business processes and determine which option is best. If you implement distributed image servers, be sure the integrated DBMS allows you to query multiple servers. Most products enable users to search multiple databases with a single query.

While nearly all products can return matching image names and retrieve the actual files in a matter of seconds, there are a few techniques that can help make retrieval even faster (see graphic, page 62).

Caching is a popular and widely supported technique for improving retrieval time. With caching, images are temporarily copied to a faster or more readily available storage area. In the context of imaging, this typically means from optical to magnetic disk media. However, some products can copy images from magnetic disk to server random-access memory. This copying slightly slows the first access to the image as it is moved from one storage area to the other. However, it greatly improves speed on subsequent accesses.

Staging is a similar technique to caching in that it brings images from near-line to on-line storage. However, staging takes place according to a regular schedule — for example, weekly or monthly. Thus, the user decides which images will be needed and moves them from one form of storage to another ahead of time. For instance, images of invoices can be moved from near-line to on-line storage the night before clerks will need them.

Prefetching is another performance-enhancing technique. When a user requests the first page of a multipage image, the system automatically prefetches the subsequent pages. For instance, all 20 pages of a manual can be moved from off-line to near-line storage when a service representative helping solve a customer's problem requests a product diagram on page 3. Access to the first page will be slow, but access to subsequent pages will be much quicker.

Staging and prefetching are considered advanced features and are supported by most high-end products and a few mid-range offerings. Low-end products do not offer prefetching. Only Soda Creek and Westbrook Technologies, Inc. offer staging in low-end products.

WINDOWS AND WORKFLOW

Another capability that is catching on among the vast majority of imaging products is support for Windows-based clients as the de facto standard application interface and image viewer. While other client environments such as Apple Computer, Inc.'s Macintosh, IBM's OS/2 and different flavors of Unix are supported on clients, Windows is the overwhelming choice among vendors today.

Some vendors simply support the Windows graphical user interface (GUI), which is already familiar to millions of end users. More sophisticated imaging products support the document editing features within Windows' DDE and OLE.

Products that fully support DDE and OLE allow users to construct compound documents from portions of other documents and move whole images or just a few selected pieces from one application to another. For instance, Watermark uses DDE and OLE 2.0 to enable users to scan a document, take a portion of the resulting image from its Professional Edition application and drop it into another document under construction in Microsoft Word.

When looking at the breadth of Windows support, be careful to understand exactly

Continued on page 62

New image operating systems emerge

Imaging software that is built directly into network operating systems is set to finally see the light of day after being the subject of much talk over the last year.

Novell, Inc. has been promising a version of image-enabled NetWare for some time and is set to deliver on it in early 1995 with the debut of the firm's Image and Document Management Services (IDMS).

IDMS will manifest itself as a layer of application program interfaces (API) buried inside the NetWare network operating system (NOS). The API layer will act as a development platform for third-party imaging vendors. IDMS is the result of a joint partnership between Novell and the Imagery Software, Inc. subsidiary of Eastman Kodak Co.

The imaging APIs embedded in NetWare will give independent software vendors (ISV) a stable development ground for building imaging systems for NetWare environments, says Lee Shaeffer, director of business development for Imagery Software. Basically, the NOS-based IDMS will include a mass storage management service to control the storage of images, an image management service to render image files for display and a document management service.

"From a customer perspective, the biggest advantage to embedding imaging services in the NOS is that the imaging products will now be tied to the network directory services," Shaeffer says. "This means that images will be available across the entire enterprise. And, depending on the architecture of the network, distributed storage of images also will be available. The user can generate one query, and the system will go out and transparently search all the servers to locate the required image."

The IDMS services will support both production and ad hoc imaging systems. It's up to the ISVs to decide what capabilities their products will offer. While several vendors are developing for this platform, few have formally announced IDMS-based products.

Two deliver

Image-enabled NetWare is currently being supported only by Image-X and Simplify Development.

IDMS will improve the already widely accepted practice of running imaging software as a NetWare Loadable Module (NLM). The most popular NLMs support database management or optical storage connectivity.

For database management, the NLM approach tends to be a more robust and secure approach than ones that depend on drive redirection. As for optical jukebox or drive connectivity, an NLM-based driver enables users to attach an optical storage device to the NetWare server rather than having to use a separate machine. Direct attachment also makes it more efficient to cache images to the file server's magnetic disk for faster access.

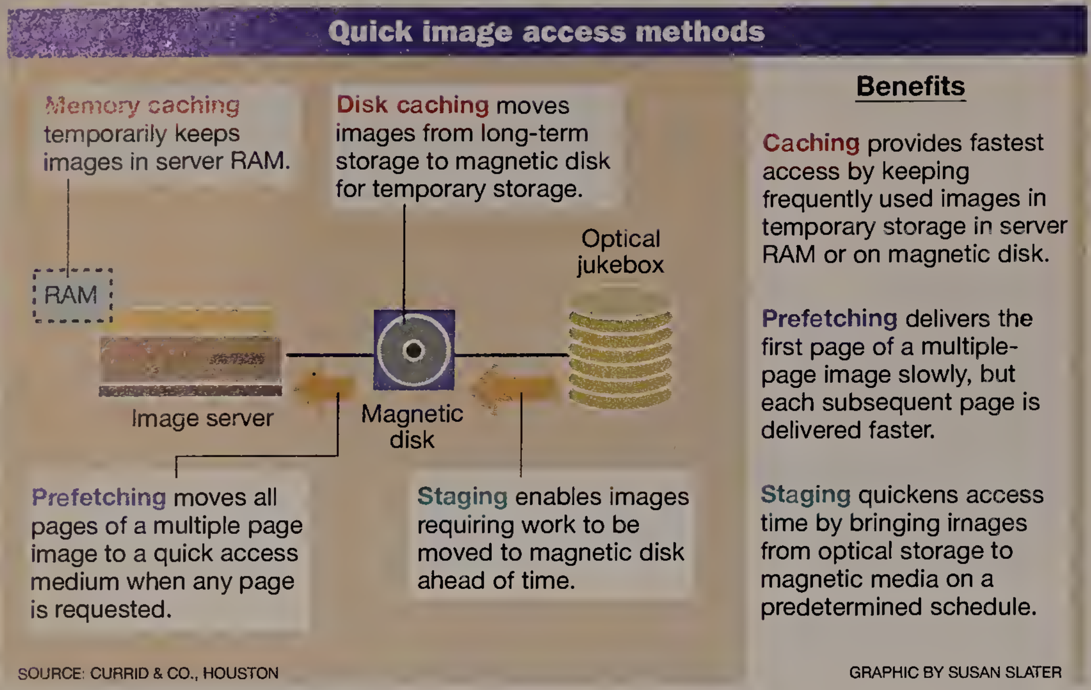
Aside from IDMS and NLMs, vendors are busily building imaging products that support Windows NT and Unix servers, largely because of the portability and scalability of these operating systems. Among the most popular Unix flavors are SunSoft, Inc.'s Solaris, The Santa Cruz Operation, Inc.'s SCO, Hewlett-Packard Co.'s HP/UX and IBM's AIX.

Buyers have many other choices for the imaging server operating platform, ranging from servers running OS/2 or Windows NT to mainframe-based systems such as MVS/ESA and VM.

Most imaging products have client components based on Microsoft Corp. Windows, with a number of products supporting DOS, OS/2, Apple Computer, Inc. Macintosh, Unix or X Window System.

Continued from page 61

which OLE version is offered. As one might expect, OLE 2.0 provides a higher level of functionality for constructing compound documents than its earlier version. OLE 2.0 is supported by Wang, FileNet and Watermark. Others plan to implement it in the future.

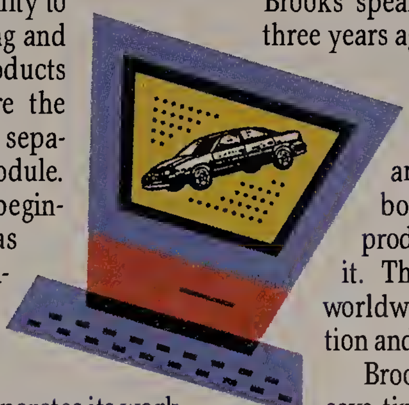

Quick image access methods
Memory caching temporarily keeps images in server RAM.
Disk caching moves images from long-term storage to magnetic disk for temporary storage.
RAM
Optical jukebox
Image server
Magnetic disk
Prefetching moves all pages of a multiple page image to a quick access medium when any page is requested.
Staging enables images requiring work to be moved to magnetic disk ahead of time.
Benefits
Caching provides fastest access by keeping frequently used images in temporary storage in server RAM or on magnetic disk.
Prefetching delivers the first page of a multiple-page image slowly, but each subsequent page is delivered faster.
Staging quickens access time by bringing images from optical storage to magnetic media on a predetermined schedule.

SOURCE: CURRID & CO., HOUSTON

GRAPHIC BY SUSAN SLATER

As with Windows, there is overwhelming support for workflow. It is used to create applications that intelligently route images and other forms of information along predefined paths following user-defined rules. Imaging systems are often associated with workflow technology because the imaging applications that give the highest payback usually involve highly structured or repetitive work.

Every vendor in the Buyer's Guide chart offers some form of workflow, whether it be a totally separate add-on product, an optional module or an interface to existing E-mail systems. By treating workflow in various ways, vendors give users the flexibility to make decisions about imaging and workflow separately. The products with the most flexibility are the ones that offer workflow as a separate add-on product or as a module. Most imaging vendors are beginning to make the products as open as possible, with multiple APIs supporting integration with many different applications.



For instance, LaserData separates its workflow product, DocuFlow, from its imaging product, LaserView for Windows. This enables users to buy each module independently. IBM also separates its workflow product, FlowMark, from its imaging product, ImagePlus.

The vast majority of products with workflow capabilities include a GUI that enables users to establish routing patterns by linking icons that represent certain actions and other users. For instance, a user can define that an approved insurance claim be moved to a clerk for payment. An E-mail message can also be sent to notify the clerk to be on the lookout for an incoming image.

FIT TO SCALE

Scalability should be a high consideration in the choice of an imaging system. Even if you start out small with a local application, the demand for more and larger applications probably will grow in the ensuing years, and you'll need to make sure the system can handle it.

A 1992 Minolta Corp. study of 300 users shows that more than half reported their systems had tripled in size in the first 18 months of usage. The applications simply exceeded all expectations for user acceptance and demand in those early phases and had to be expanded.

That trend is ongoing today as evidenced by Spalding, which had to step up implementation plans to deal with demand for more applications. The company's goal now is to reach a 95% to 98% paperless environment that can eliminate mistakes resulting from out-of-date paper-based information.

Initially, the company wanted to bring three business units on-line with imaging applications in the first year, but it wound up rolling imaging out to nine units that first year just to keep up with demand.

Looking at it from another vantage point, Spalding's pilot project involved only two PCs. There are now about 150 PCs using imaging, says H. Oldham Brooks, operations research manager.

Brooks spearheaded the imaging project three years ago. At that time, Spalding had an expensive, paper-bound product specification process that forced employees and customers to dive into books that had a picture of each product along with text describing it. These books were distributed worldwide, resulting in high production and distribution costs.

Brooks saw the opportunity to save time — which is money — and best of all, reduce errors with imaging. He prototyped a small application using Keyfile, showing how information could be generated and managed on-line.

Now anyone who needs access to information in the specification book can call up pages on-line and in real-time. Within months of the prototype's success, all the firm's units were clamoring for image-based applications.

"The best part of this is we now know that everyone is seeing the same version of information," Brooks says. "The old paper books were frequently outdated, and often the users didn't know it." Other benefits include improved customer service and a significant reduction in time to market with new products.

Spalding had cast a curious eye upon imaging some time ago when company officials visited a few nearby banks and looked at their high-end production systems. But those systems were ruled out as being too expensive.

When Spalding heard that Keyfile, headquartered up the road in Nashua, N.H., had a product that could run on existing PCs, company officials paid the vendor a visit. While the product could run on the PCs Spalding already had, it required Windows, which was missing.

Spalding made a tactical decision to introduce both imaging and Windows at the same time, which paid off in spades. Windows made the application so easy and so obvious to use that it really reduced the need for the company to do extensive user training. Brooks says he can get a new user up and running with the imaging applications in about 45 minutes.

The firm runs Keyfile on a NetWare LAN anchored by an OS/2 server. Spalding is beta-testing a version of Keyfile that runs on Hewlett-Packard Co. systems. If this works out, Brooks says the company may phase out the OS/2 server in favor of existing HP hardware.

MORE IMPORTANT FEATURES

While each product has its own unique or interesting way of doing things, there are a few important features to look for when making a buying decision. For one thing, how do images get into the system? The most basic method is via scanning, either via a scanner attached to each user's desktop or via a centralized scanner. Convenience is a consideration here.

For enterprisewide or production-level imaging applications, look for batch scanning support. This can be a real time-saver for inputting very large volumes of information. Your chosen system also may support individual scanning at the desktop, shared scanning via a central scanner and software, or both.

E-mail and fax integration is important. In fact, the workflow aspect of an imaging system might be highly dependent on E-mail. Look for products that support multiple E-mail standards to give you the maximum amount of integration and interchangeability. These products send and receive images via fax and E-mail without having to first print the image, then scan or fax it, to get it into or out of the system.

Vendors excelling in E-mail and fax integration include Compulink Management Center, Inc., IBM, Identitech, ImageFast Software Systems, Image-X, Imagination Software, Keyfile, Network Imaging Systems, PaperWise, Simplify Development and Watermark.

Another valuable feature is image annotation, which is the ability to post electronic sticky notes on an image. Some products place an icon on the image where a note is tacked. When the icon is selected, the note becomes visible. LN:DI provides this minimal feature.

Continued on page 64

The role of standards in imaging

There are quite a few standards that play a role in the imaging system purchase decision. Some standards deal with file formats, others have to do with the way image files are compressed and decompressed for efficient storage and retrieval.

When examining these standards, remember that they are not all created equal. That is, one vendor's implementation of a standard might be slightly different from another vendor's. In a closed system, where all files are generated and used by the same application, this really doesn't matter. However, in an imaging system that is tightly integrated with office productivity tools, this inconsistency of standards can greatly influence how work gets done.

As an example, suppose an image created with a presentation graphics package needs to be saved as an imaging system file. Completing the task requires users to convert the graphic file into a Tagged Image File Format (TIFF). Even though the imaging system claims to be able to import TIFF files, the user discovers that the image viewer that should display the converted graphic file cannot accurately display the image. Subtleties in vendors' implementations of the TIFF standard are to blame.

To avoid conflicts such as these, users should test file interchangeability before purchasing an imaging system. If significant problems arise, users will have to look for add-on file conversion utilities or work with the vendor to develop a long-term solution.

Users deploying imaging in a departmental or enterprisewide environment will undoubtedly need to import or export files from one application to another. There are several standard file formats commonly used today for the translation of image files. The most popular formats include the following:

BMP — In Microsoft Corp.'s Windows, an extension indicating that the file contains a Windows-compatible bitmapped graphic.

GIF — A bitmapped color graphics file format for IBM-compatible computers. GIF employs an efficient compression technique for high-resolution graphics such as scanned images.

PCX — A file extension indicating that the file contains a graphic in the PCX graphics format. PCX was originally developed for Softkey International, Inc.'s PC Paintbrush program but is now widely used by other graphics applications.

TIFF — A bitmapped graphics format for scanned images with resolutions up to 300 dot/inch. TIFF simulates gray-scale shading.

Due to the large size of most image files, imaging systems compress the files to conserve space as the documents are stored. While there are many compression/decompression techniques, the most common technique used was developed by the Joint Photographic Experts Group (JPEG) and is known as JPEG. This compression technique can reduce graphics file size by as much as 96%. The compression technique causes some images to appear smoother and less detailed.

In addition to the JPEG, several other organizations are attempting to create, or at least influence, standards in the imaging market. New standards for document preparation, capture and indexing; document compression and decompression; document transmission and exchange; document access and storage; and document delivery, printing and display are emerging.

Most of the work is being done by the Association for Information and Image Management. Other trade groups are also getting into the standards act. For instance, the 1,400 members of Xplor International, an electronic document imaging industry trade group, is developing standards. So are the IEEE and the National Institute of Standards and Technology (NIST).

The IEEE and NIST are both developing standard procedures that will enable imaging and multimedia applications to run in an open systems environment.

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Continued from page 62

Other products allow users to annotate an image with text highlights, arrows, sticky notes and even voice remarks. Annotation can be even more important if many people are collaborating on or using each image. Check out Keyfile and Watermark for their annotation capabilities.

ADDING IT ALL UP

As you budget for an imaging system, your total projected costs should include the hardware, software, integration, administration and a thorough business process analysis performed by internal or external staff. Your purchase analysis should include an inventory of your requirements, including the type of image files that need to be stored, the size of each file, how fast images accumulate in the system, how they are retained and the type of storage device that will be used.

On average, per client costs range from $99 to $15,000, emphasizing the broad range of capabilities. Costs will increase in proportion to the amount of integration and customization required.

Some products allow users to buy the client software without having to use the image server software. Thus, users get the features needed to scan and view images, but they have little or no capability for mass storage. LaserData's LaserView for Windows, Lotus' LN:DI, Simplify Development's MailRoom for Windows and Watermark's Professional Edition are sold in this manner. Of course, the vendors of these products also have server-based components that provide full storage capabilities.

This trend of offering imaging systems as modules or components to a larger business workflow system is sure to continue. Look for products with plenty of APIs to other applications to emerge soon.

If a picture is worth a thousand words today, it could be worth a million tomorrow.

➡ Musthaler is vice president of research at Currid & Co., a Houston-based technology consulting firm. She can be reached at (713) 789-5995.

Scanners, OCR complete the buy

To make any imaging system complete, users need to acquire scanning equipment and optical character recognition (OCR) software. Of the two, a scanning subsystem is an absolute requirement. The OCR component may be just a nice extra.

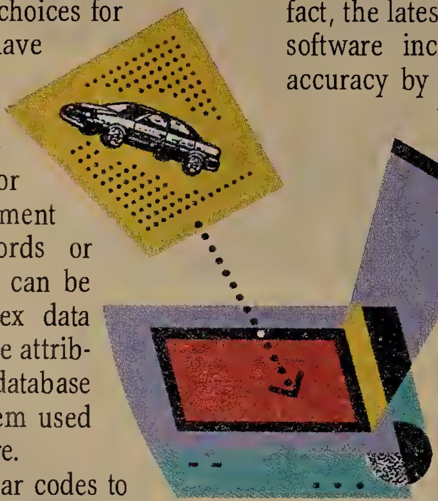
Most scanning and OCR engines were developed by a core group of manufacturers that license their technology for inclusion in integrated imaging products. Thus, the selection of imaging software will often tie a user to a particular brand of scanner and OCR software.

The most basic purpose of the scanner is to turn words or images into digital form. With additional software provided by the imaging system vendor, users are able to organize this digital data into manageable, searchable information. That's where document indexing comes in.

Users have a few choices for indexing. They can have an operator type in document attributes that pertain to the just-scanned image. For example, the document subject, or key words or phrases of an image, can be entered into an index data attribute record. These attributes get stored in the database management subsystem used by the imaging software.

Users can attach bar codes to their documents prior to scanning. Then, information from these bar codes can be automatically recognized and dumped into a database when the image is scanned. This is useful for large volumes of documents, such as insurance claim forms.

OCR and full-text indexing go hand in hand for complete image management. When combined, these technologies address the problem of automating indexing and retrieval by creating a searchable, character-based version of images, such as documents. Full-text indexing could be important for published materials such as magazine articles or reference manuals.



As anyone would expect, accuracy is a key requirement in scanning and OCR. The challenge for the OCR component is to distinguish among the different fonts and typefaces used on the document image, as well as individual characters such as the number zero and the capital letter O.

If the OCR software flags these characters as unknown, the operator has an opportunity to make a judgment about the right character and manually enter it as the image is scanned. However, the software may also make its own judgment, and occasionally make a wrong guess which often fails to get noticed until the image is called up for viewing for the first time.

OCR manufacturers such as Calera Recognition Systems, Inc. are constantly improving on their OCR algorithms and techniques in order to increase accuracy. In fact, the latest release of Calera's WordScan software increased character recognition accuracy by about 30% over the previous version. Prominent manufacturers in the OCR market include Calera and the company it recently merged with, Caere Corp., as well as ExperVision, Inc., Olduvai Corp. and Xerox Imaging Systems.

As for scanners, the choices vary widely from desktop personal units to shared departmental units. Some are intended for light use, while others are geared for heavy-duty production use, enabling the scanning of thousands of documents per day. Some scanners have sheet feeders to enable unattended batch scanning.

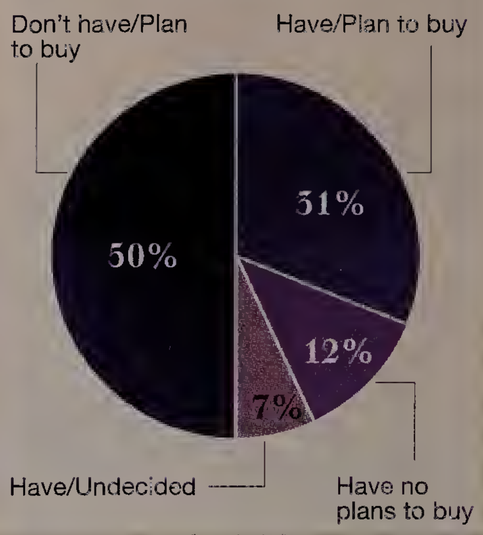
There are more than 140 scanner manufacturers. Some of the most prominent manufacturers include Fujitsu America, Inc., Panasonic Co., Hewlett-Packard Co., CalComp, Inc., Canon Computer Systems, Inc. and Digital Equipment Corp.

FileNet Corp., a leading imaging software vendor, also manufactures its own line of scanners.

Reader views on imaging systems

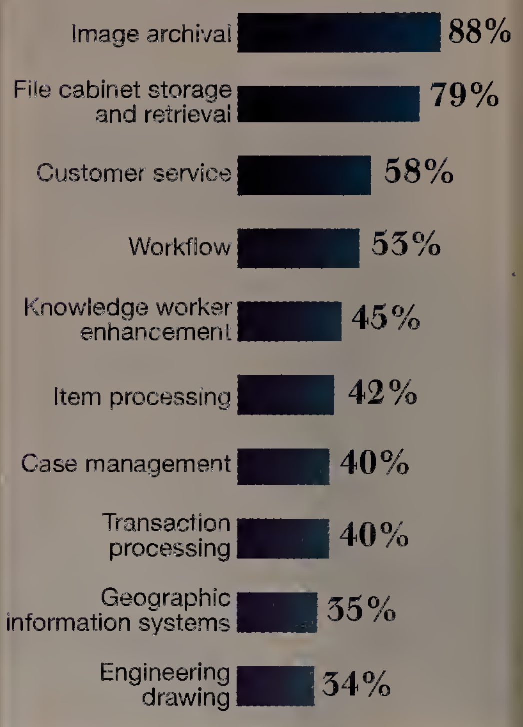
Based on 100 interviews.

Do you have/plan to purchase an imaging system within the next 12 months?



For which applications do/will you use your imaging system?

(Multiple responses allowed.)

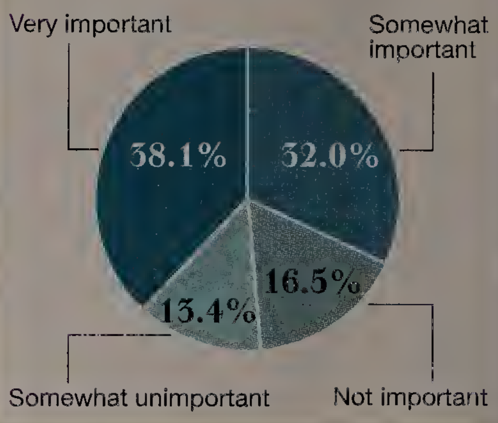


What is your most important criterion when selecting an imaging system?

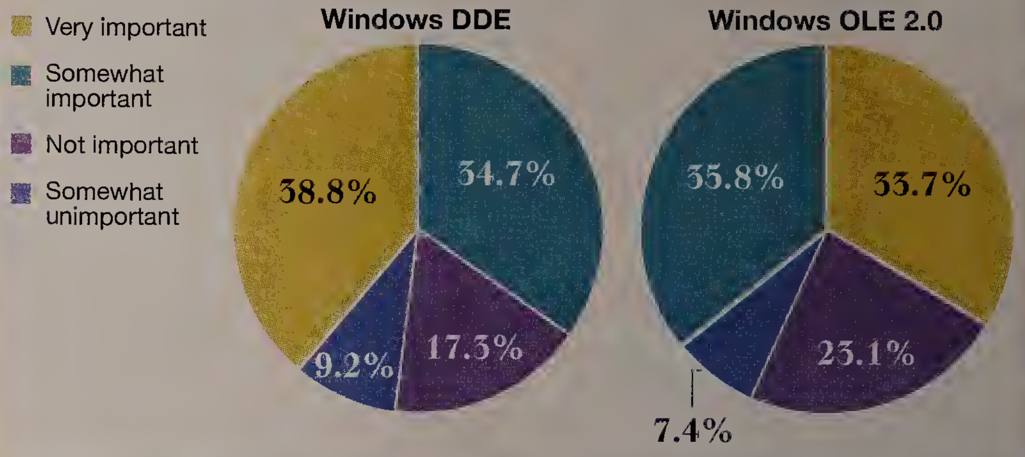
Based on a highest possible score of 10.

Ease of use	8.30
Standards conformance	8.25
Total file capacity	7.96
Multiple desktop client support	7.41
E-mail and fax application integration	7.19
Multiple data object support	7.00
Price	6.98
Workflow support	6.94
Multiple third-party DBMS support	6.93
Third-party application development tool support	6.72

Is it important for your system to be built directly into a LAN operating system such as Novell's Image Enabled NetWare?



How important is Windows DDE and OLE 2.0 support when selecting your imaging system?



Key service and support issues

Based on a highest possible score of 3.

Ease of installation	2.42
On-site service included in warranty	2.15
Toll-free hot line	1.94
Optional on-site service contracts	1.85
Free software upgrades	1.85
Next-day availability of parts	1.71

Focus Data, an independent market research firm in Framingham, Mass., conducted this survey. Focus Data specializes in gathering primary data from end-user organizations regarding their enterprise network environment and needs. For more information about Focus Data services, call Mona Dabbon at (508) 626-2556.

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In a Nutshell

A **PRIMER** *on emerging technologies*

SGML: A lifesaver in a sea of electronic documents

By Adrienne Azaria

Users seeking greater flexibility in the creation and sharing of documents across networks can now look to the emerging Standard Generalized Markup Language (SGML) standard.

SGML, fast becoming an international standard for electronic document interchange, is an encoding standard that makes it possible to share and reuse the information in documents across applications and across computing platforms. Much the same way as the data in spreadsheets and databases can be shared, SGML provides a universal way to identify, manage and share the information in documents.

While traditional document conversion programs preserve a document's format, SGML preserves the content (the information) and the structure (the relationships among the data). Constraining large-scale searches by the documents' structured elements makes it easier and faster to locate and share information, particularly across divergent networks and applications.

For example, because the structure is preserved, you can search for information within a document by specifying instances, such as "Find references to Chrysler in all titles," rather than locating every instance of Chrysler throughout the entire document. SGML further boosts productivity by enabling users to locate text, graphics and other information in documents and reuse them for multiple purposes. No more islands of isolated information.

SGML ORIGINS

SGML was developed in the 1960s as an extension of Charles Goldfarb's work at IBM under the auspices of the Graphic Communications Association. During the mid-'80s, SGML came into greater prominence as part of a major Department of Defense program to automate the delivery of technical documentation from private vendors to the government. In 1986, SGML was adopted by the International Standards Organization.

Today, a wide variety of other organizations are moving their strategic documents to SGML, including firms in the telecommunications, electronics, automotive, defense and commercial aviation industries.

"The power of SGML is not that it allows you to structure a single document but that you can structure entire libraries so that workgroups can easily construct new documents or new collections from the document 'bricks' they've already created," explains Mary Laplante, executive director of SGML Open, the international nonprofit consortium of suppliers whose products and services support SGML.

HOW DOES SGML WORK?

Just as SQL enables you to access information from databases on any platform, SGML lets you locate and reuse document information created with SGML-compliant authoring or conversion software located anywhere on a network. This is accomplished in large measure thanks to two fundamental SGML components — SGML tags and Document Type Definitions (DTD). (For a listing of additional SGML components, see graphic.)

Key SGML components

While specific applications will vary, every SGML application contains the following basic components:

- **Document elements** — Identifiable components within a document such as paragraphs, titles and tables.
- **Tags** — Labels that identify document elements.
- **Tag set** — A list of all document elements.
- **Attributes** — Qualifiers associated with document elements used to further refine searches.
- **Document instances** — Actual marked-up text that has been SGML-encoded.
- **Document Type Definition (DTD)** — A template that identifies the class of document (manual, catalog, proposal) and specifies the rules for the structure of the document, listing all elements allowed within a document instance and their order.
- **SGML declaration** — Identifies the character set mapping and the SGML features to be used by a DTD.

This information was compiled from *The SGML Guide*, an Interleaf publication that answers the 50 most commonly asked questions about SGML. To request a copy, please call (800) 456-5323.

SGML tags are essentially labels that describe parts of the document such as a headline, section or part number. A tag set is simply a list of all the allowable document elements (or objects) from such things as chapters, paragraphs and subparagraphs. SGML tags let you break down documents into modules that can be lifted from the document and reused elsewhere.

This enables firms to more effectively leverage document-based information for a variety of purposes. Imagine, for instance, that the technical publications group of an automotive manufacturing firm writes all service manuals in SGML. Because these service manuals are tagged in SGML, the information in those documents can be easily located by other groups within the firm and then reused to build other documents. For example, the dealer support group might reformat the service manual information and distribute it to dealers nationwide as an on-line electronic database with hypertext links. Or they might use a subset of the data to produce a price book or company catalog.

But tagging alone is not enough. An SGML document must adhere to a structure that is defined in a DTD. A DTD specifies the rules for the structure of the document, listing which elements are allowed within the document, as well as the order in which they should appear. A firm will typically develop different DTDs for the various types of documents it produces. For example, a manufacturer might write a DTD for its illustrated parts catalog, specifying that each part number be followed by a part description and an illustration. The same firm would have a different DTD for a product manual, an annual report or any other kind of document.

STEPPING UP TO SGML

If you want to adopt SGML, you don't have to do it overnight. In fact, there are many advantages to a phased implementation.

Making the transition to SGML can be expensive because it requires significant work force training as well as reengineering the document authoring and distribution process. A phased implementation enables you to experience benefits quickly without incurring all of the expense up front.

An excellent first step is to improve your current document system. Organize your system by types of documents and enforce the use of standard style sheets for each document type. Also, start identifying and recording document content and rules. As a pilot, try managing a single project using an SGML-compliant application in tandem with existing projects using current proprietary programs.

Members of SGML Open

The international nonprofit consortium of suppliers whose products and services support SGML include:

- Advanced Information Systems
- Avalanche Development
- Database Publishing Systems
- Data Conversion Laboratories
- InContext
- Interleaf
- Novell
- OpenText
- Oracle
- SoftQuad
- XSoft

These measures are intended to increase the consistency and content identification in your documents. This will prove indispensable when you convert documents to SGML. It will also put the information systems (IS) manager and publishing professional in a better position to define the DTDs that best meet your organization's needs.

As you are making this transition, you will want to investigate the various tools you will need for a complete SGML-based document system.

Conversion tools, typically used by IS managers, let you convert non-SGML documents into SGML. This allows firms to add structure to documents created on legacy systems.

SGML authoring and publishing tools let you add SGML tags as you create or revise documents. An SGML document management tool provides access and version control, searching and review/approval capabilities. SGML distribution tools enable you to distribute documents (typically for viewing only) to users across the network and to navigate through the structure of those documents to locate information.

Adopting SGML frequently requires significant retooling of existing document creation, management and distribution methods. Migrating gradually to a system that supports both SGML and non-SGML documents lets you minimize costs while positioning your firm for the benefits of full-fledged SGML compliance.

Azaria is product manager for the SGML publishing product line at Interleaf, Inc. and can be reached via Internet at adrienne@ileaf.com.

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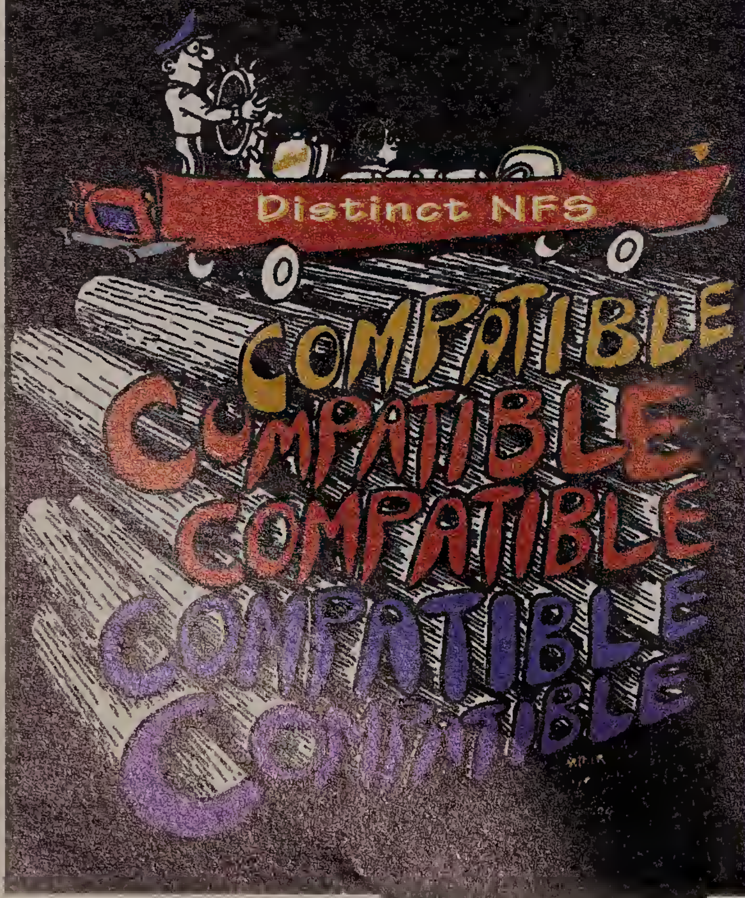

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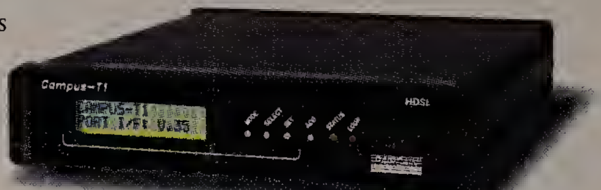

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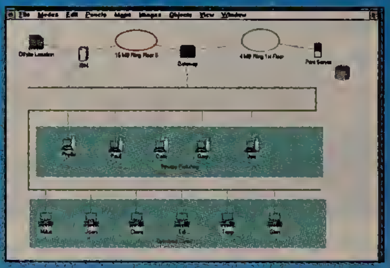

MANs – Plot cellular locations

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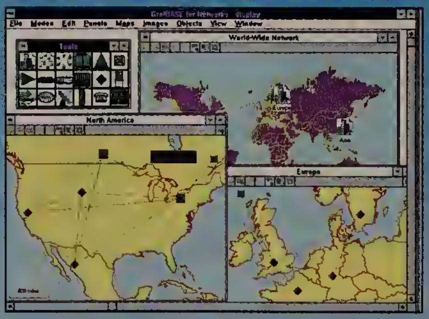
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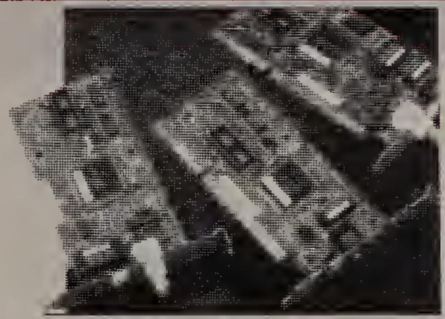

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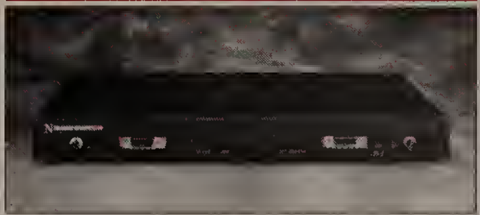

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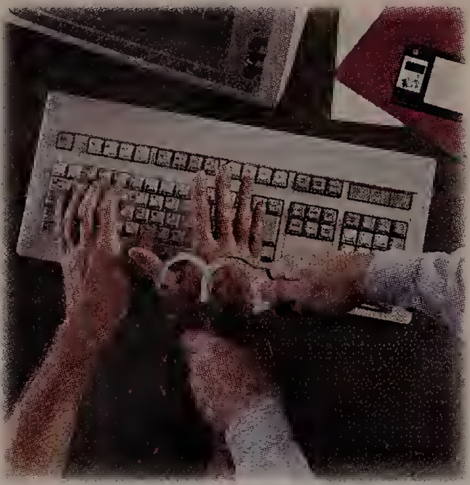

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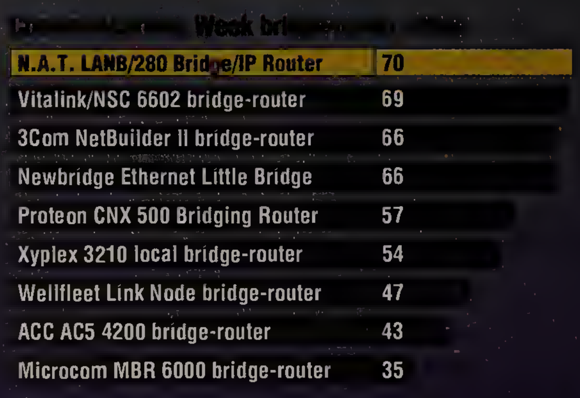

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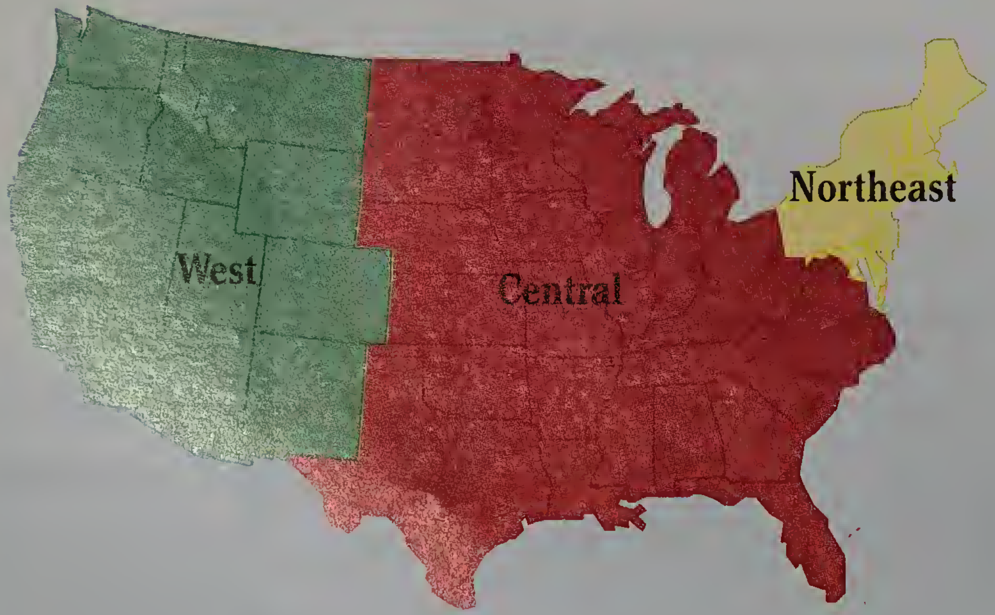

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64	65	66	67	68	69	70	71	72
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109	110	111	112	113	114	115	116	117
118	119	120	121	122	123	124	125	126
127	128	129	130	131	132	133	134	135
136	137	138	139	140	141	142	143	144
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MARKETPLACE:

217	218	219	220	221	222	223	224	225
226	227	228	229	230	231	232	233	234
235	236	237	238	239	240	241	242	243
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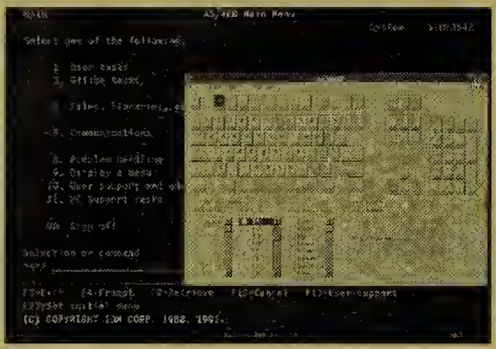

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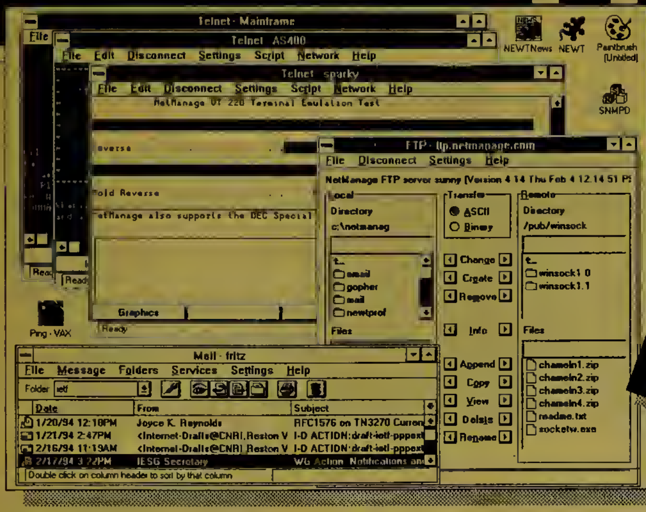

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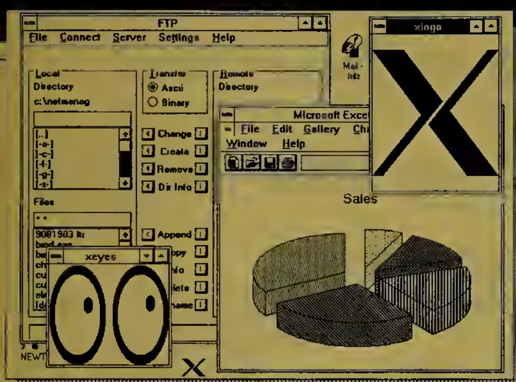

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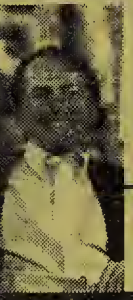

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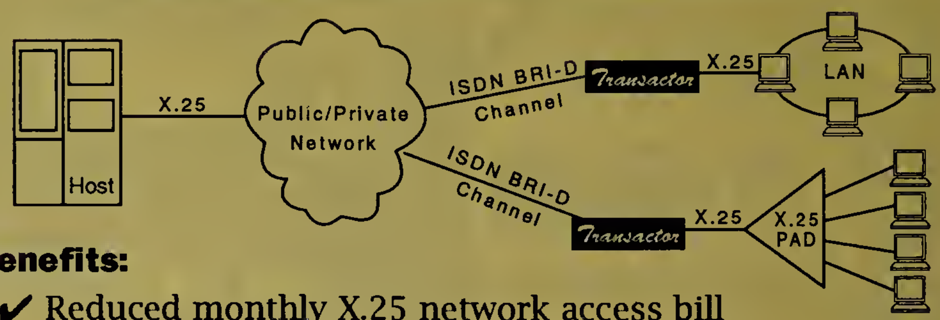

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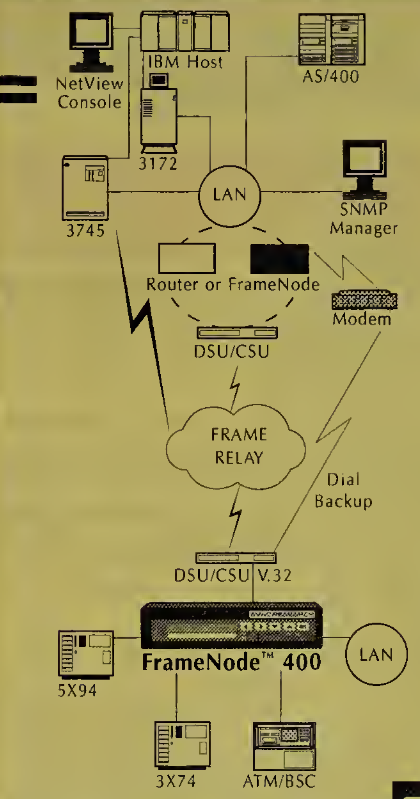

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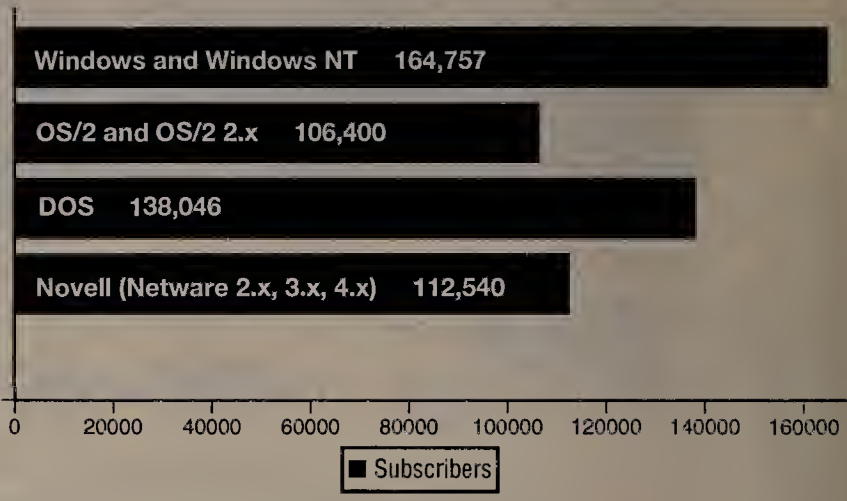

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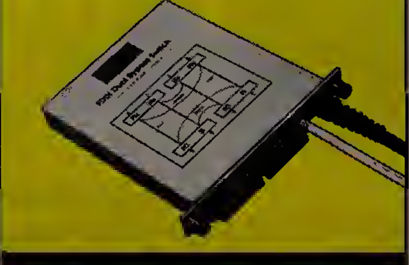

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"[Cisco] needs to get into the ATM market because there won't be a router market when there is an ATM market."
Thomas Nolle, CIMI

* * *

"I don't think [Cisco] suffers from a Not Invented Here syndrome."
Andy Schopick, Nutmeg Securities

* * *

"Cisco clearly would prefer an acquisition. They did a great job of getting 10% of Cascade and made a ton of money on the investment, but I don't think it's giving them the control they would have wanted."
Mark D'Annolfo, Adams Harkness

* * *

"We believe that [Cisco has] to do this to sustain demand for the 7000 because once LAN emulation standards become software standards, it will reduce some of the demand for the 7000."
Gina Sockolow, Josephthal Lyon & Ross

LightStream

Continued from page 1

and local ATM networks. It also has a variety of wide-area interfaces and could act as a core WAN switching node in big private nets.

Cisco offers the HyperSwitch A100, under an OEM arrangement with NEC Corp., for ATM switching at the workgroup level, as well as the Catalyst and EtherSwitch devices for departmental and workgroup LAN switching.

Catalyst came from last year's acquisition of Crescendo Communications Corp., and EtherSwitch was obtained with the purchase of Kalpana, Inc., completed last week.

GETTING AHEAD

Not only does the LightStream acquisition give Cisco an enterprise-level, wide-area ATM switch, but it also puts the company about nine months ahead of rival Bay Networks, Inc., whose Lightsabre switch will serve a similar next-generation role when it is introduced in the third quarter of next year, sources said.

Following on the heels of last month's Kalpana acquisition, the LightStream buy was hailed as a great move for Cisco, and a bargain.

"Cisco should consider themselves extremely lucky," said Tom Golway, director of emerging technologies at GCE Consulting, Inc. in New York. "About six or 12 months down the road, they're going to realize enormous benefits."

Todd Dagres, first vice president of Robinson-Humphrey Company, Inc., an Atlanta-based securities firm, added, "This gives them the wide-area ATM switch they need."

The LightStream switch is one of the first to integrate routing and ATM switching in its design, with application-specific integrated circuit-based routers distributed on every interface card. But the current release supports only bridging, with IP and IPX routing still waiting in the wings.

"LightStream's difficulty is a dearth of routing software," said Nick Lippis, principal of Strategic Networks Consulting, Inc. in Rockland, Mass. "Cisco could really make their concept come alive."

Cisco needs only to meld its Internetworking Operating System with LightStream's core ATM signaling and traffic management software, which is a planned enhancement.

Continental Cablevision deployed seven 2020 switches this summer with routing potential in mind. "Right now, the only function we can harness is bridging," said Kevin Casey, Continental's vice president of engineering. "I'd like to think the synergies [of Cisco and LightStream] would get us a true routing capability for better ATM LAN emulation."

"We're going to be concentrating on campus-area ATM nets initially," said Cisco user David Zimmerman, telecommunications analyst at Rutgers University in New Brunswick, N.J. "But we're looking at connecting the campuses via ATM, and that would direct us toward a wide-area product like LightStream."

Cisco owns a 6.8% stake in Cascade Communications Corp., but due to the switch maker's focus on the carrier market and a technological bend toward frame relay, the router firm did not turn to Cascade for a wide-area ATM switch. Cisco now has to provide seamless desktop-to-wide-area switching with four different architectures. But analysts see this as a nonissue because users deploy different switches at the workgroup, departmental, backbone and WAN levels anyway.

"Right now in the market, that's the case," said John DePietro, WAN analyst at International Data Corp. in Framingham, Mass. "Today, there is no single provider from desktop to so on."

Dagres speculated that LightStream struggled with a difficult cash-flow situation, and its earnings may have frustrated BBN and UB. Continental Cablevision is the only announced major LightStream 2020 customer.

In a press conference after the deal was signed, BBN President and Chief Executive Officer George Conrades said BBN is focusing on Internet access and services, and would use its $100 million share of the sale to finance that thrust.

That's a turnabout for BBN, which indicated when LightStream was formed that ATM switching would be key to its future.

"They pulled the plug on something that they told everybody was their core strategy," said Rick Malone, principal of Vertical Systems Group in Dedham, Mass.

UB will get $20 million cash and will continue the Cisco technology partnership announced in October.

Cisco will maintain LightStream's facilities in Billerica, Mass., serving as the headquarters of its new ATM Enterprise Business Unit. Jonathan Crane, CEO of LightStream, is expected to head the unit.

Comments?

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Harmonic

Continued from page 1

process more than 150,000 payment authorizations per month.

One of its customers, The Buckle, a Midwest clothing chain, said the system has cut the average response time for a credit check from between 24 and 26 seconds to 7.8 seconds, helping it keep lines shorter.

The Harmonic system works with existing point-of-sale equipment, and can process credit card and personal check authorizations while simultaneously transmitting inventory, ordering and other data.

The system features a five-port combination router/modem called a Retail Integration Module (RIM), manufactured for Harmonic by AT&T Global Information Solutions, said Barrs Lewis, president of Harmonic.

RIM ships data from devices in each store, including registers and personal computers, to the retailer's data center via dial-up lines.

Using TCP/IP protocols and proprietary techniques that the firm declined to detail, RIM establishes a 2,400 bit/sec dial-up link to Harmonic's Enterprise Gateway Processor (EGP), which comprises an IBM RISC System/6000 and a Cisco Systems, Inc. router located in the user's data center.

Data compression boosts throughput to as high as 14.4K bit/sec.

The RS/6000 sorts the various types of data and ensures responses are sent to the correct location. The router supports a 56K bit/sec frame relay link to MasterCard International, Inc., which processes credit card authorizations and checks verifications.

The cost per store ranges from $700 to $1,000 for RIM and all required software, depending on the number of stores in the chain. The EGP costs $80,000 to $150,000, depending on features.

Harmonic has also struck a deal under which its customers can contact MasterCard directly, bypassing third parties that would otherwise provide the service. That is one way the Harmonic system saves its users time and money, Cooper said.

The system also eliminates some of the steps typically required in a dial-up transaction (see graphic) and features what Lewis called a turbocharger that reduces response time as the system gets busier. Once a dial-up link has been established from the store to MasterCard, the store can fire off more requests without waiting for a response to the first.

"No one else has that capability in a dial environment," he said. Such features are reserved for more expensive leased-line or frame relay-based credit authorization systems.

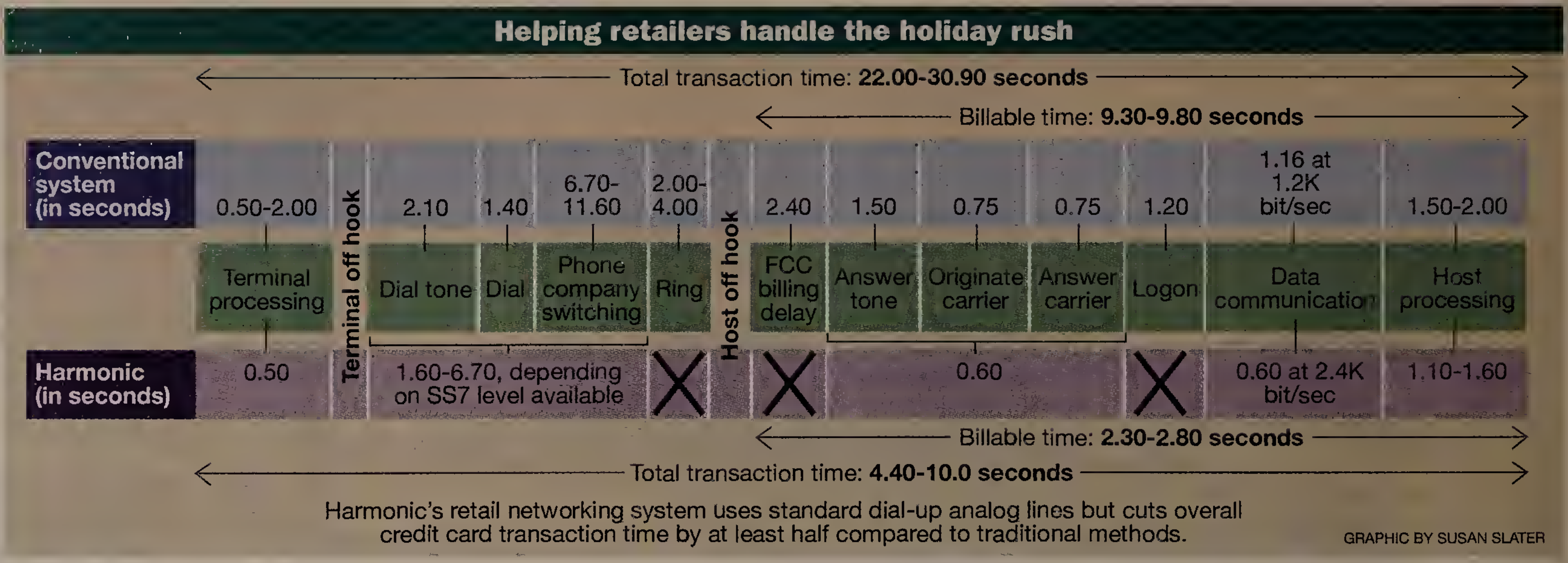
Harmonic's clients include Musicland Group, Inc. and The Buckle, with 147 stores.

Wayne Daugherty, the Buckle's vice president of operations, said the system handles credit checks so quickly that he hasn't had to rent extra cash registers for the Christmas rush, as he had anticipated. The system also handles file transfers and electronic mail without interrupting credit checks.

Tom Friedman, editor and publisher of "Retail Systems Alert" newsletter in Newton, Mass., said previous options for midsize retail chains included satellites and use of Synchronous Data Link Control protocols, which required dedicated nets. Major carriers also offer retail-specific networks, but Friedman likened them to huge bureaucracies with limited offerings.

"Harmonic has created a menu plan for retailers," he said.

©Harmonic: (612) 672-9330.


Helping retailers handle the holiday rush

Harmonic's retail networking system uses standard dial-up analog lines but cuts overall credit card transaction time by at least half compared to traditional methods.

GRAPHIC BY SUSAN SLATER

NETWORK WORLD

161 Worcester Road
Framingham, Mass. 01701-9172
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Banks

Continued from page 1

by RSA Data Security, Inc. to provide authentication and encryption for users of its World-Wide Web clients and servers. The BankAmerica-Netscape deal will let merchants set up secure Web-based ordering systems.

The Web, which connects Internet resources around the world via hyperlinks, has emerged as a major channel for businesses seeking to go on-line, but it was not designed with security in mind.

CommerceNet, like BankAmerica and Netscape, also plans to use RSA technology for its security technology, dubbed Secure Hypertext Transport Protocol. Banc One hopes to begin internal pilots of the technology in the first quarter of next year and then find some corporate customers willing to participate, said Steve Dierenger, group product manager for electronic services at Banc One of Columbus, a subsidiary of Banc One.

Michael Killen, president of Killen & Associates, a Palo Alto, Calif., technology think tank, predicted that adequate security measures will become widely available on the Internet in the first half of 1995.

IT'S THE LAW

Ensuring secure transactions may be more important to banks than other businesses because under various federal and state laws, banks can be held accountable for the actions of others. For example, if a merchant fails to deliver a product, the bank is held responsible for reimbursing the purchaser, he said.

Dierenger said the potential risk is compounded when the products are intangible items such as information or software delivered over a computer network.

"How do you verify that they're delivering the goods and services?" he asked.

The same holds true for bulk transactions, such as electronic funds transfers sent across a value-added network. "If a VAN mishandles the data, ultimately, the bank's still responsible," Dierenger said.

Banks have come under increasing pressure in recent months to develop on-line strategies. Killen said Microsoft sent a wake-up call to banks with its announced plans to buy Intuit Corp.

Microsoft is looking at ways to link Intuit's popular Quicken home finances software, which lets users pay bills electronically, with its proposed Microsoft Network. The combination could turn into an on-line financial system that could begin to compete with banks, Killen said.

Mark Vogel, vice president and director of on-line consumer financial services at BankAmerica, acknowledged the potential threat. "His vision is a good vision," he said of Microsoft Chairman Bill Gates.

But despite all the publicity about the Intuit deal, "most banks haven't the foggiest idea what it means to them and even less about what to do about it," Killen said.

Key to success

Within 10 years, certifying public keys for Internet transactions could become a $5.0 billion industry, according to Killen & Associates.

Because the Internet is developing so quickly as a new business channel, banks will have only a narrow window of opportunity to get on-line and be successful, he said.

NEW OPPORTUNITIES

Vogel said one of the first thing banks could do on-line is extend their existing services, for example, by offering home banking. Some banks, including BankAmerica, already offer such services, typically through proprietary software and hardware. But the Internet may give them the infrastructure to provide users with financial management software linked to the user's bank and investments accounts, he said.

Dierenger said electronic links to business customers would let Banc One offer an entirely new line of information services. One example would be to notify customers when checks and drafts clear.

Banks have long offered electronic funds transfer services, but Internet E-mail would let banks dash off notices to several employees within a company at once — for example to both the accounts receivable and credit departments.

The field of authenticating the identity of people and companies seeking to make purchases across the Internet could also get hot, Dierenger said. Large-scale public-key systems typically rely on a certification authority to warehouse the public keys and guarantee their validity.

"A number of people inside the bank became very excited about the possibility of becoming a certifying authority," he said.

WHY THE INTERNET?

Commercial networks such as CompuServe and Prodigy have long offered electronic malls and the promise of secure credit card transactions. But the Internet is far more attractive as a potential new channel for banks, according to Dierenger and Vogel.

For one thing, the network simply has a far wider reach, they said. It is also a standards-based network, meaning a bank does not have to worry about proprietary networking and display specifications on the commercial nets.

"People also have become more comfortable with [the Internet] technology," Dierenger added.

Mainframe

Continued from page 1

ing in the ability to support their mission critical applications," says Thomas Nolle, president of the CIMI Corp. consultancy in Voorhees, N.J. "So they are beginning to reinvest in mainframes, not necessarily to add into the client/server environment, but to continue to run their businesses successfully."

Market researchers at Xephon in Berkshire, England, say a good portion of the increased demand for mainframes is coming from existing Big Iron users.

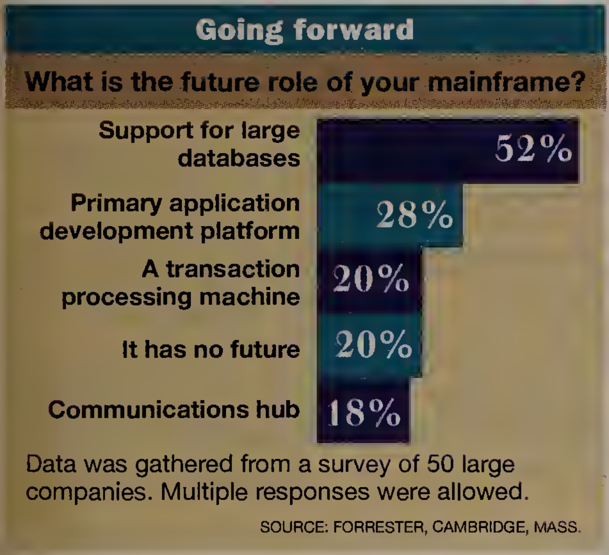
A recent study of 738 mainframe sites worldwide shows IBM MVS mainframe shops increasing MIPS at 24% per year.

According to Xephon, more than half of the sites in the survey had a client/server implementation with the mainframe involved.

Steve Josselyn, manager of systems market research at International Data Corp. in Framingham, Mass., says, "The recent increase in mainframe demand reflects a recognition that the mainframe is cost-competitive and still does some things very well that can't be done in other environments."

Josselyn notes that, while mainframe sales bottomed out in 1993, they have rebounded since then and are expected to grow at an average 27% annually over the next six years (see graphic, page 1).

Going forward



Data was gathered from a survey of 50 large companies. Multiple responses were allowed.

SOURCE: FORRESTER, CAMBRIDGE, MASS.

He also says that while mainframe sales will increase in the next few years, the value of those systems will decrease, meaning users will be able to get more for less.

COST OF OWNERSHIP

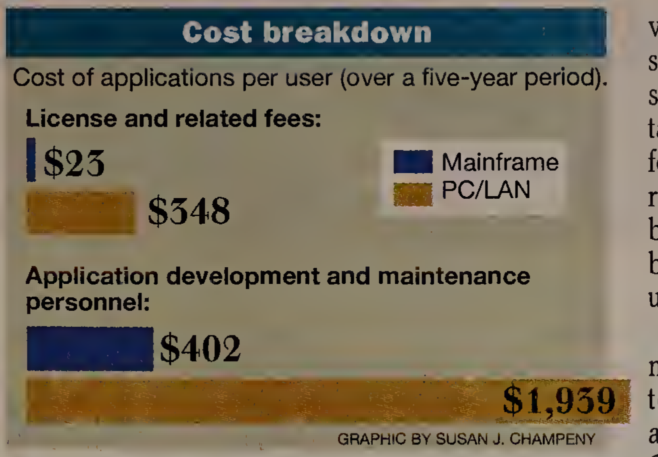
It is perplexing that mainframes can still sell at all given their expense relative to other technologies. According to IDC, the guideline selling price of an ES9000 Model 9021-982 — one of IBM's most powerful machines — is $31 million. The monster can process 390 MIPS and, at that price, equates to a cost of $80,750/MIPS. In reality, the street prices of mainframes weigh in between $30,000 to $35,000/MIPS, according to Josselyn.

By comparison, IDC says a 90-MHz Pentium-based IBM PC 730 costs $2,716 and can process 150 MIPS, equating to $18/MIPS — a mere difference of $29,982/MIPS.

IBM executives say they would like to get the cost of their new Complimentary Metal Oxide Semiconductor-based parallel mainframes down to about $8,000/MIPS by the end of 1995. That's still a far cry from the cost of Pentium servers and other equipment needed to put together a "mainframe alternative."

But costs can be deceiving. When items such as automation tools, management products and training are factored in, the mainframe starts to look good.

Cost breakdown



GRAPHIC BY SUSAN J. CHAMPENY

A study by the Gartner Group, Inc. consultancy, based in Stamford, Conn., reveals that, while a fully loaded PC costs close to $3,000, the hidden costs, such as training and problem determination, can bring the price tag to as much as $8,000 a year.

A company with 2,000 PCs linked in a network can expect to spend about $16 million annually in direct and hidden costs, Gartner stated.

A study by the International Technology Group in Mountain View, Calif., reveals that, depending on the size of the installation, mainframes cost $950 to $6,146 per user per year, with the average cost being $2,282. It calculated the cost per user of PC LAN-based systems ranging from $4,191 to $7,750 (depending on size), with an average of $6,445 per user.

BACK TO THE FUTURE

While cost is a driving factor in purchasing decisions, users note a variety of other reasons for sticking with or redeploying mainframes.

"Whether it was implicit or explicit, there was pressure from within the company over the past few years to move off of the mainframe," says Ron Sanderson, manager of network software and support for the state of Illinois' Bureau of Communications and Computer Sciences/Information Services in Springfield.

"But we are a geographically dispersed utility with over 900 sites, so the costs of running a distributed net like that were astronomical, plus we could never guarantee the performance and reliability of such a system; it wasn't economically viable, and it just didn't make good business sense," he says.

J.B. Hunt, a large trucking firm, recently bought a new mainframe for the purpose of making it a server to its mobile OS/2-based client work force. Executives there say PC LAN-based systems could not provide the security of the mainframe.

John Harrington, data center manager with Madison Gas & Electric in Wisconsin, says all of the distributed systems that the utility has built up over the past few years are now being tied back to their mainframe, making it a server of servers.

"It's fun to be a cowboy for a while, but when you get down to the day-to-day operations of distributed systems, only the data center and the mainframe have the capabilities to handle it," Harrington says. "It was too expensive and complicated for us to support multiple disparate, distributed LANs so we brought control back to the mainframe.

"Client/server technology is said to give users the tools to empower themselves," he adds. "We think it gives most users just enough rope to hang themselves."

Linda Mainord, director of application services for the Memphis City School system in Tennessee and president of the IBM user group Guide International, says that many organizations are having difficulty implementing client/server computing.

"The challenge of bringing together multivendor products so that parts of a single business task can be performed on separate processors is beyond the capabilities of most users," she says.

Ken Gunther, manager of systems engineering at Estee Lauder Co. in New York, says his firm is planning to upgrade its 3090 mainframe with a new IBM parallel processor because it doesn't think client/server will be mature by the time the company runs out of processing power.

"We are just frustrated with Unix; it's not a mature technology or a mature operating system like the mainframe operating systems are," he says. "The open systems were designed for the hacker-type people, and they really haven't moved away from that."

THE DOWN SIDE OF HOSTS

On the other side of the coin, users and analysts say mainframe vendors haven't completely turned the corner on adding new capabilities that would make the Big Iron any more cost-effective or attractive than it was in the past.

"The IBM mainframe in our shop is becoming a large-scale data server, and I think it will remain in our environment for the foreseeable future," says David Ellis, director of network services for the Home Depot in Atlanta. "However, it is only one element on our network and it is no longer the driving force for any of the enterprise networking product purchasing or application development decisions we are making today."

According to Todd Dagres, vice president of equity research for the Robinson-Humphrey Company, Inc. investment firm in Atlanta, it is naive for vendors to think the mainframe upsurge will continue.

"We think the trend may last two more quarters, and, by the end of next year, we'll see the numbers go back down," he says.

Even IBM is cautious. Jerry York, IBM's chief financial officer, warned Wall Street analysts last month that strong mainframe growth may be temporary.

GET UP OR GET OUT

What it seems to boil down to is this: While users may have considered eliminating the mainframe, most have found the new platforms too complicated, risky or expensive to justify that move today and are investing in hosts once again.

It is too early to tell whether these investments represent a stopgap solution or are a sign that the mainframe is here to stay.

Software may ultimately be the deciding factor. If independent software vendors abandon the mainframe in favor of smaller platforms, it won't matter how much the machines ultimately cost.

The Big Iron could find itself back on the canvas.

Comments?

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Eicon

Continued from page 1

Basic I/O Systems traffic flow over TCP/IP backbones. The Eicon implementation does not support NETBIOS but may in the future, company executives said.

Eicon's offering follows on the heels of Cisco Systems, Inc.'s Native Client Interface Architecture (NCIA), announced last month, that encapsulates 3270 datastreams in TCP/IP at the client workstation.

However, Cisco's NCIA only works with Cisco routers, and Desktop DLSw works with any DLSw router.

"Desktop DLSw lets users employ one protocol across their LANs and WANs," said Maks Wulkan, executive vice president of Eicon. "Plus, users can save perhaps thousands of dollars by not having to implement DLSw software on every router in their nets."

Running on a workstation emulating a 3270 or 5250 SNA device, Desktop DLSw encapsulates the 3270 or 5250 data in TCP/IP packets and moves it over the LAN and across the WAN to a host. A router supporting DLSw is required at the data's final destination but not at the local or remote site.

"This eliminates IP and [Logical Link Control 2] address handling and queuing at the router, reducing memory and CPU requirements on the router," Wulkan said.

Users found this aspect of the Eicon announcement intriguing, although they were skeptical.

"DLSw adds a lot of overhead to the router, so it would be nice if we could reduce it. But I'm not sure I want to move that overhead to the desktop," said Brian Spears, manager of information technology for Konica Business Machines USA, Inc. in Windsor, Conn.

"If it could save us some bandwidth, I'd be all for it," added Greg Veltri, director of network services with AcGo Services Corp. in Engelwood, Colo. "It sounds like it would be more useful for users with large internetworks and many routers doing DLSw."

With Desktop DLSw, users also will be able to tailor the bandwidth provided to individual SNA applications. And they could prioritize the SNA traffic from the workstation.

Wulkan noted that the Desktop DLSw feature is more functional than tn3270 because tn3270 does not support any SNA priority measures or SNA printing services.

THE EARLY BIRD

"The earlier users can do encapsulation better. But if Eicon users start freely establishing multiple sessions, the routers are going to have to concentrate them so tons of sessions don't traverse the WAN all at once," said Robin Layland, principal consultant with Layland Consulting in West Hartford, Conn.

"Cisco can do this with its [downstream physical unit] support, but it's unclear how others will handle that," he said.

Others faulted the firm for not supporting NETBIOS in the first release.

"It assumes TCP/IP ends up being the backbone of choice, which isn't the case since about two out of three corporate backbones remain SNA," said Paul Wickre, director of sales and marketing at Hypercom, Inc., a router vendor in Phoenix.

The Eicon product does give users another option in the way they handle SNA traffic, added Lucinda Santisario-Borovick, research manager of computer networking architecture for International Data Corp. in Framingham, Mass. "It will also be interesting to see how this product handles the proprietary extensions many vendors add to DLSw."

For example, Cisco has flow control, queuing and prioritization schemes that work with its DLSw implementation.

Desktop DLSw will become a standard feature in Eicon's Access for Windows product in January 1995. The package will sell for $395.

Current users can upgrade for free. Eicon's other packages, 3270 and 5250 client software for Windows NT, DOS and OS/2, will be rolled out later next year.

©Eicon: (514) 631-2592.

> **"If it could save us some bandwidth, I'd be all for it. It sounds like it would be more useful for users with large internetworks and many routers doing DLSw."**

Switches

Continued from page 4

Chipcom also announced 20- and 40-port 10Base-T Media Modules for its ONcore Switching System. They provide users with port switching between any combination of eight backplane or eight extended Ethernet segments simultaneously.

THE OLD SWITCHEROO

Separately, SysKonnect announced the SK-NET Switch 6616, a rack-mountable switch that supports 16 independent Ethernet segments and two optional high-speed LAN interfaces — a Single Attach Stations FDDI LAN interface and a Dual Attach Stations FDDI LAN interface.

Any port can connect a single user or a shared Ethernet hub and deliver 10M byte/sec to each desktop or workgroup. The switch includes Simple Network Management Protocol management capabilities.

Fibermux introduced the CrossSwitch FX304 stand-alone Ethernet switch, a four-port device with either attachment unit interface or RJ-45 connections. It offers full-duplex communications, flow control, on-the-fly switching, selectable latency and optional SNMP management.

Madge Networks announced the Smart Ring Access Module (SmartRAM), a stackable hub that users will be able to attach directly to a new token-ring switch Madge Networks has planned for next year, said Scott Rikimaru, a product manager for the firm.

Designed for midsize workgroups and branch offices, the SmartRAM supports as many as 20 users.

Hubs can be linked to two others via Madge Networks' Smart Lobe Attachment Modules to support as many as 60 users.

The hub ships with Remote Monitoring traffic monitoring and Madge Networks' TrueView Controlled Access Unit Manager, a Windows-based graphical hub management application that supports SNMP.

Alantec: (408) 955-9000; Chipcom: (508) 460-8900; Fibermux: (800) 342-3768; Madge Networks: (800) 876-2343; SysKonnect: (408) 437-3800.

➡Staff Writer Jodi Cohen contributed to this report.

Switch roundup

Company Product(s)	Pricing	Availability
Alantec		
PowerHub 7000 FDDIswitch	$31,000 and up	Now
Chipcom		
ONcore Token Ring Active Module-Switching Media Module	$3,595	30 days
10-Slot B ONcore Switching System	$5,295	Now
ONcore 10Base-T Media Module	$4,195 (20 ports); $6,995 (40 ports)	45 days (20 ports); 90 days (40 ports)
Fibermux		
CrossSwitch FX304	$2,895-$3,700	Now
Madge Networks		
SmartRAM	$3,700 (UTP version); $3,900 (STP version)	Now
SysKonnect		
SK-NET Switch 6616	$9,495	Now

GRAPHIC BY TERRI MITCHELL

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Back to Reality

Rise in mainframe use is hazardous to your health; insecurity on the 'Net.

BY DAVID J. BUERGER

I am appalled by news that demand for mainframe computers is rising. More surprising is the apparent joy with which some confused souls are greeting this news.

Wanting more mainframes is like lusting to clean the oven or scrape off old wallpaper or drive — I mean crawl — down the Long Island Expressway.

This is not good news. In fact, it's a calamity.

A calamity, as defined by Ambrose Bierce, is "a more than commonly plain and unmistakable reminder that the affairs of this life are not of our own ordering. Calamities are of two types: misfortune to ourselves, and good fortune to others."

There are lots of reasons why mainframes are not healthy and cause misfortune to people. Here are 10:

1. Mainframe computer rooms are too cold, which restricts your wardrobe. Be honest: How many mainframe jocks have you ever seen with*out* a sweater, turtleneck or beard? And they are *long* beards, too.

2. The floors in mainframe computer rooms suck — literally. Floors that sound like they are about to swallow you up are bad for your health. Just ask your doctor.

3. (I won't mention that some sub-computer-floor realms are home to a bevy of strange creatures. You may scoff, but when was the last time you checked?)

4. Mainframe computers are too big. Large is out; small is in. My kids advise me never to trust a computer that you can't hold in your hands. You should heed their wise advice.

5. Mainframe computer languages are too bizarre and hard to learn. Most of us speak normal languages, like English, French, Pig Latin, Microsoft Word and Excel, plus maybe a few dBase dialects. It's a push to write a DDE link between those applications and virtually impossible for most people to jot down anything in mainframe-speak. How do you say "Where is the bathroom?" in COBOL or PL1?

6. Mainframe computer printouts are ugly. Where do you put all those hole-filled confetti-like strips of paper?

7. Developing mainframe applications takes too long. By the time its keepers can spec, write, debug and deliver a mainframe application, PCs and LANs are three generations ahead.

With all those generations floating around, it's no surprise that misunderstanding abounds. Better to be confused on the same wavelength and stick with the faster solution.

8. People who understand mainframe computers are dying off. Just imagine your reaction to calling the computer center for help in a few years and hearing a recording: "We're sorry, but all programmers are either dead or in the hospital. Good luck, and God bless you."

9. You have to use funny-looking cables to link LANs into mainframes.

10. Blue is not my favorite color.

There is, of course, a flip side to the calamity of resurging use of mainframe computers. According to the experts cited in this week's news article, users will save gobs of money by junking client/server solutions and reverting to mainframe computers.

The funny thing about statistics is they are always true. Fiscal arguments in favor of the mainframe sound a bit like Bill and Hillary Clinton flacking their health care plan. It's so logical, but why don't I feel comfortable with the spreadsheet?

Among the unarguable benefits is a reprieve for legions of COBOL programmers who won't have to endure training in C++ and object-oriented programming. That would have been a waste anyway because they never did, and probably never will, understand PCs and LANs. Mainframe jocks also won't have to give up their spiffycomputer centers (always the envy of network managers who never had a physical asset to claim under their domain).

And, finally, Lou Gerstner will reap at least a few more quarters of a rising stock price before investors figure out the mainframe's true future.

One touchy fallout from this renewed lovefest with the mainframe is a potential identity crisis for PC LAN lovers. These True Believers have preached client/server and death-to-the-mainframe for so long that the reemergence of this specter is unsettling.

Computer center managers had better keep an eye on those folks. They might decide to hasten the mainframe's death with a shotgun or at least cut it off by the token ring.

Feeling insecure

If more mainframe computers are making you feel insecure, I doubt the current state of commerce over the Internet will cheer you up. The trick is to ensure that things you buy over the Internet are actually delivered and to prevent crackers from stealing things like your credit card number.

Several vendors hope to roll out schemes early next year to protect us from virtual muggings. Trouble is, these techniques don't appear destined to work together. Maybe these vendors could use a mainframe-to-coordinate security. Then I'd feel *real* secure.

➡ Buerger is an Atlanta-based industry consultant and contributing editor to *Network World*. He can be reached at dbuerger@pipeline.com or (404) 495-7494.

How to reach us

Call: (508) 875-6400
Fax: (508) 820-3467
Write: *Network World*, 161 Worcester Road, Framingham, Mass. 01701
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CyberSpeak

Voices from the reader network

If you were to go back to school, what areas would you focus on to become a better network manager?

◆ "The toughest aspect of being a net manager is not the 'net,' but rather the 'manager' portion of the title.

"The greatest challenge for many managers is dealing rationally, effectively and professionally with employees and customers during times of pressure. Due to the relative instability of the network world, courtesy is a luxury that is often sacrificed in lieu of rapid problem resolution.

"I think that my efforts would best be served by pursuing future scholarly efforts in organizational behavior (with a minor in political science for use during the budget season)."

Richard Bastone, manager of data communications, Dean Witter Trust Co., Jersey City, N.J.

◆ "Psychology and political science."

John Owens, network manager, a large government agency

◆ "Probably more of the high-speed communications type of technologies — packet switching and ISDN. I'd like to get more in-depth with protocols, such as [Asynchronous Transfer Mode]."

Jonathan Smalls, Internet administrator, Betac Corp., Alexandria, Va.

Next Week CyberSpeak Out!

You've been pretty good this year. What network goodies do you hope Santa brings your way?

Responses due by 8 p.m. Thursday, Dec. 15. You'll get a T-shirt if we print your response. Please include your name, company and address.

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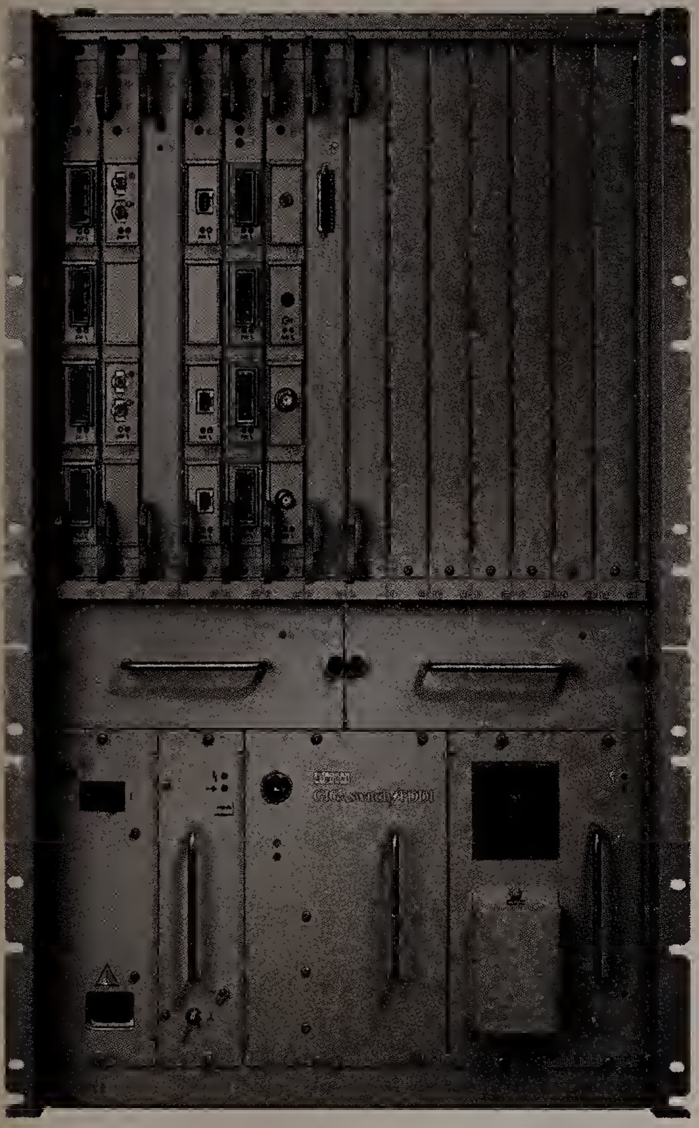

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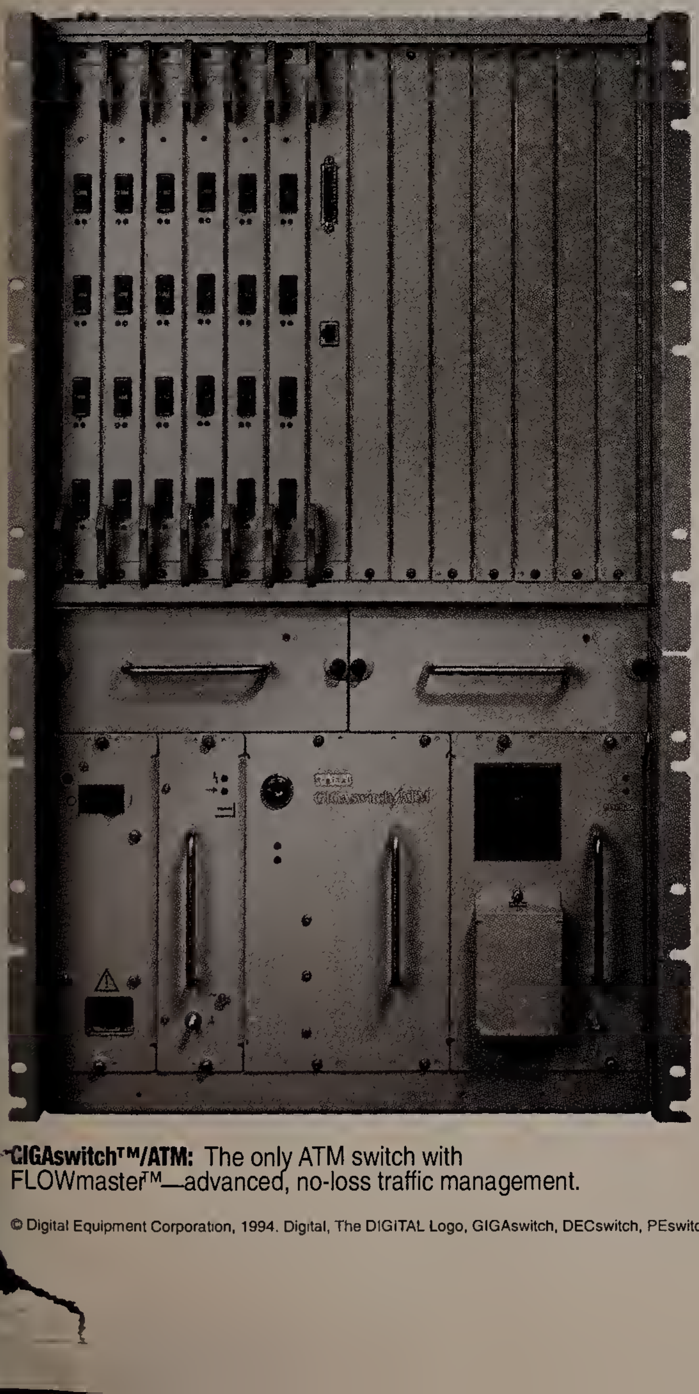

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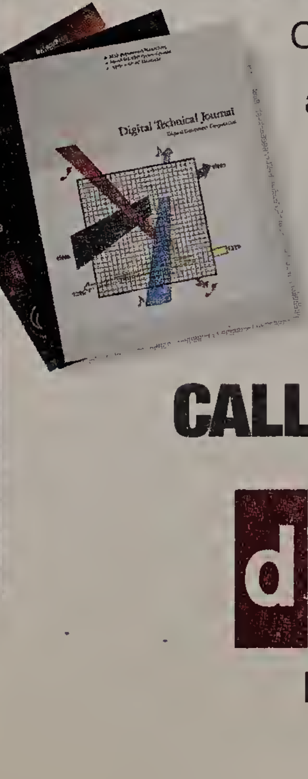

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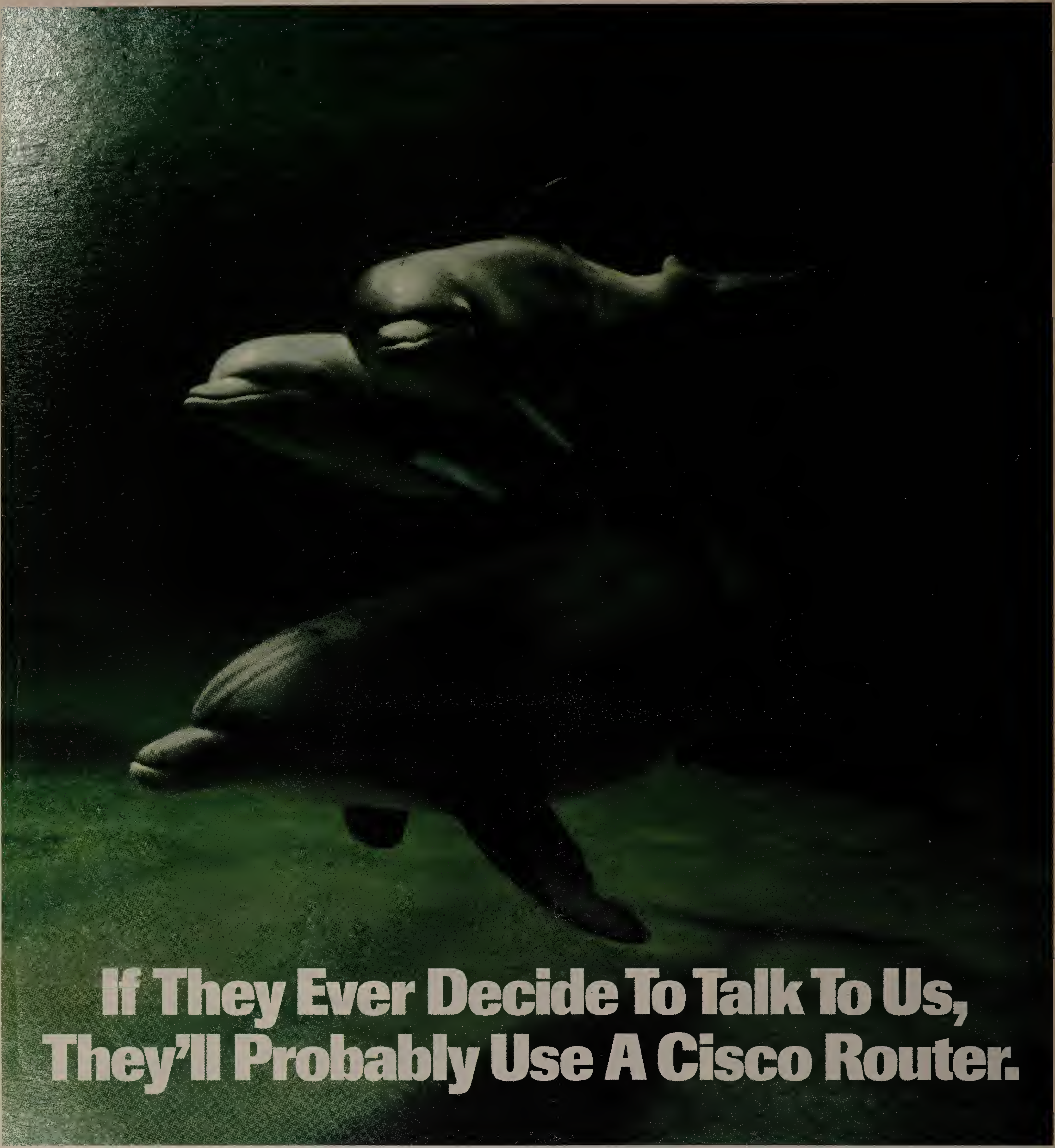
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